

Figure 1-A

Composition analysis of cupric silicate (synthesized at acidic reaction conditions) using EDAX attached to SEM (Scanning Electron Microscope).

## Weight % Element

Filename	O K	NaK	Sik	ClK	CuK
II.spc	45.39	1.74	6.33	13.92	32.63

## Atomic % Element

Filename	O k	NaK	Sik	ClK	CuK
II.spc	70.15	1.87	5.57	9.71	12.70

Figure 1-B

ESR (Electron spin resonance) spectrometer analysis of cupric silicate (synthesized at acidic reaction conditions).

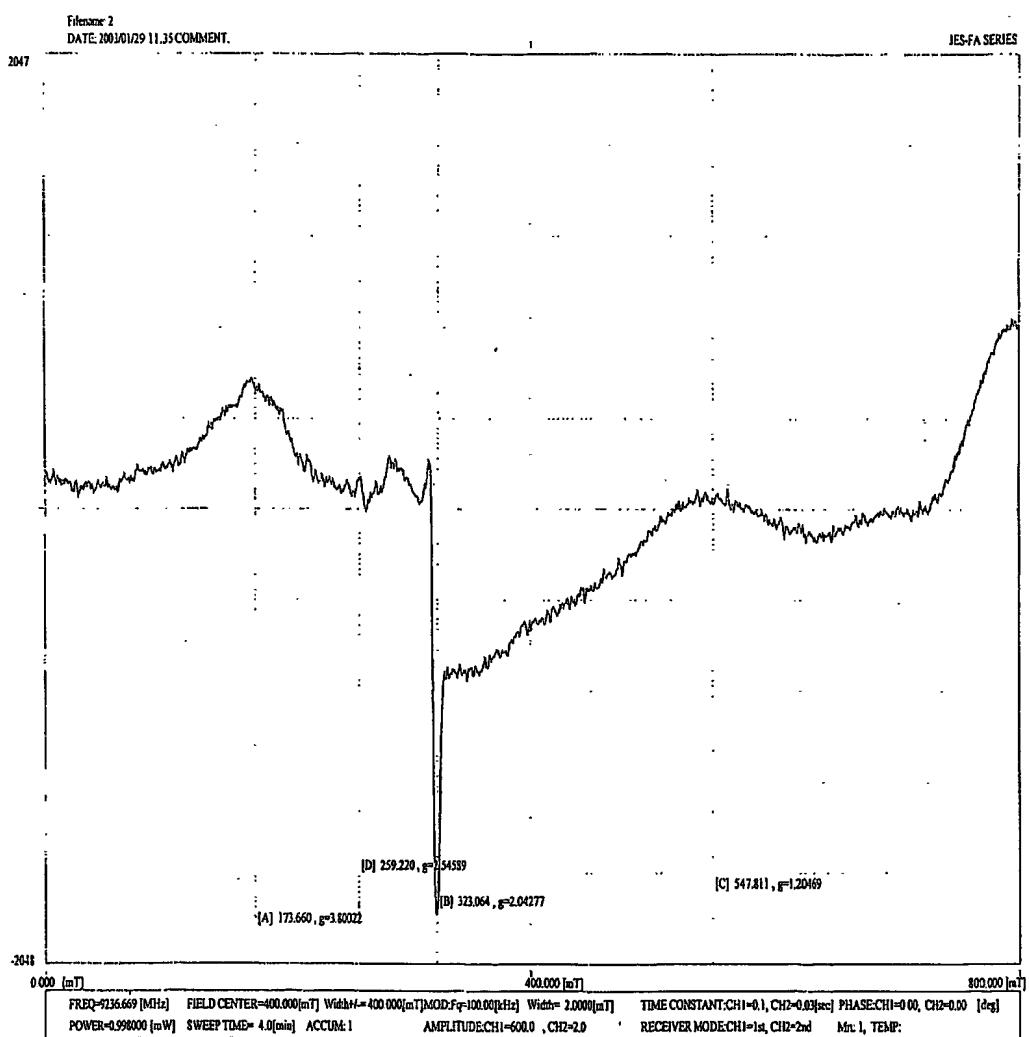
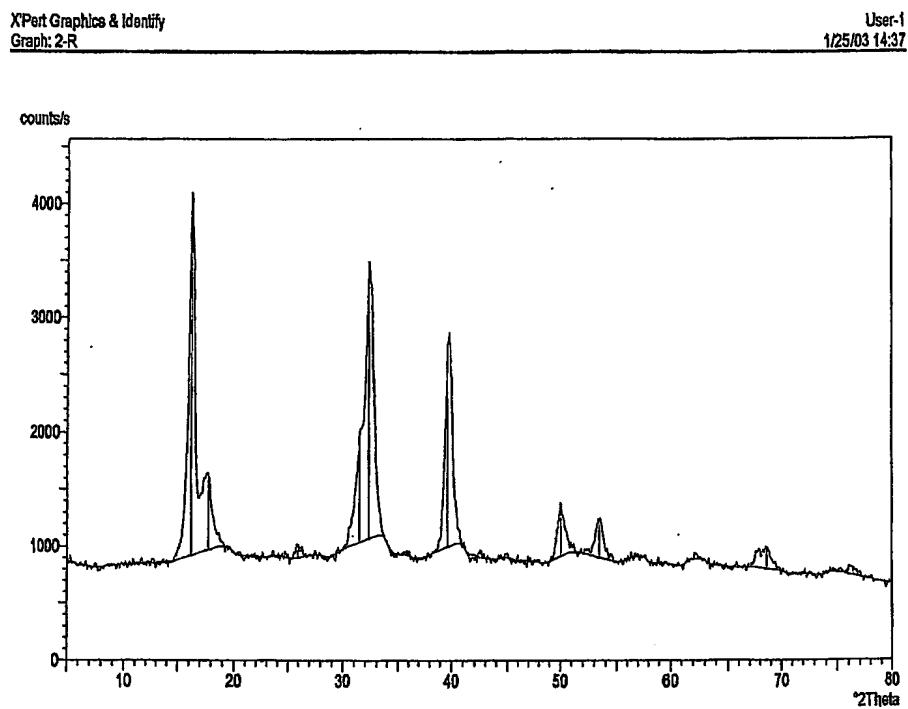


Figure 1-C

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XRD (X-ray diffraction) pattern of cupric silicate (synthesized at acidic reaction conditions).



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Figure 1-C

XRD (X-ray diffraction) pattern of cupric silicate (synthesized at acidic reaction conditions).

X'Pert Graphics & Identify  
(searched) peak list; 2-R 2

User-1  
1/25/03 14:38

Original scan: 2-R  
Description of scan:

Used wavelength: K-Alpha1

K-Alpha1 wavelength (Å): 1.54056  
K-Alpha2 wavelength (Å): 1.54439  
K-Alpha2/K-Alpha1 intensity ratio : 0.50000  
K-Alpha wavelength (Å): 1.54056  
K-Beta wavelength (Å): 1.39222

Peak search parameter set:  
Set created: 1/8/03 13:03  
Peak positions defined by: Minimum of 2nd derivative  
Minimum peak tip width ("2Theta): 0.00  
Minimum peak tip width ("2Theta): 1.00  
Peak base width ("2Theta): 2.00  
Minimum significance: 0.60

d-spacing (Å)	Relative Intensity (%)	Angle ("2Theta)	Peak Height (counts/s)	Background (counts/s)	Tip Width ("2Theta)	Significance
5.48673	100.00	16.14080	3156.22	923.90	0.44000	19.72
5.00327	20.71	17.71241	653.63	972.81	0.64000	4.14
3.43222	3.34	25.93831	105.37	906.45	0.48000	1.22
2.84108	30.80	31.46211	972.17	1038.45	0.20000	0.64
2.77130	75.78	32.27568	2391.87	1069.38	0.28000	2.91
2.27354	54.06	39.60778	1706.22	998.03	0.40000	7.76
1.82288	14.67	49.99281	463.03	916.51	0.20000	0.77
1.71366	10.53	53.42228	332.20	906.86	0.48000	1.89
1.36697	5.89	68.59540	185.87	802.15	0.48000	0.84
1.24612	1.96	76.36139	61.84	747.02	0.96000	0.83

Figure 2-A

Composition analysis of cupric silicate (synthesized at acidic reaction conditions and at high temperature 70<sup>0</sup>C to 90<sup>0</sup>C) using EDAX attached to SEM (Scanning Electron Microscope).

Weight % by Element

Filename	O K	NaK	SiK	ClK	CuK
c-nat.spc	45.84	0.89	27.31	4.63	21.33

Atomic % Element

Filename	O K	NaK	SiK	ClK	CuK
c-nat.spc	65.98	0.89	22.39	3.01	7.73

Figure 2-B

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ESR (Electron spin resonance) spectrometer analysis of cupric silicate (synthesized at acidic reaction conditions and at higher temperature  $70^{\circ}\text{C}$  to  $90^{\circ}\text{C}$ ).

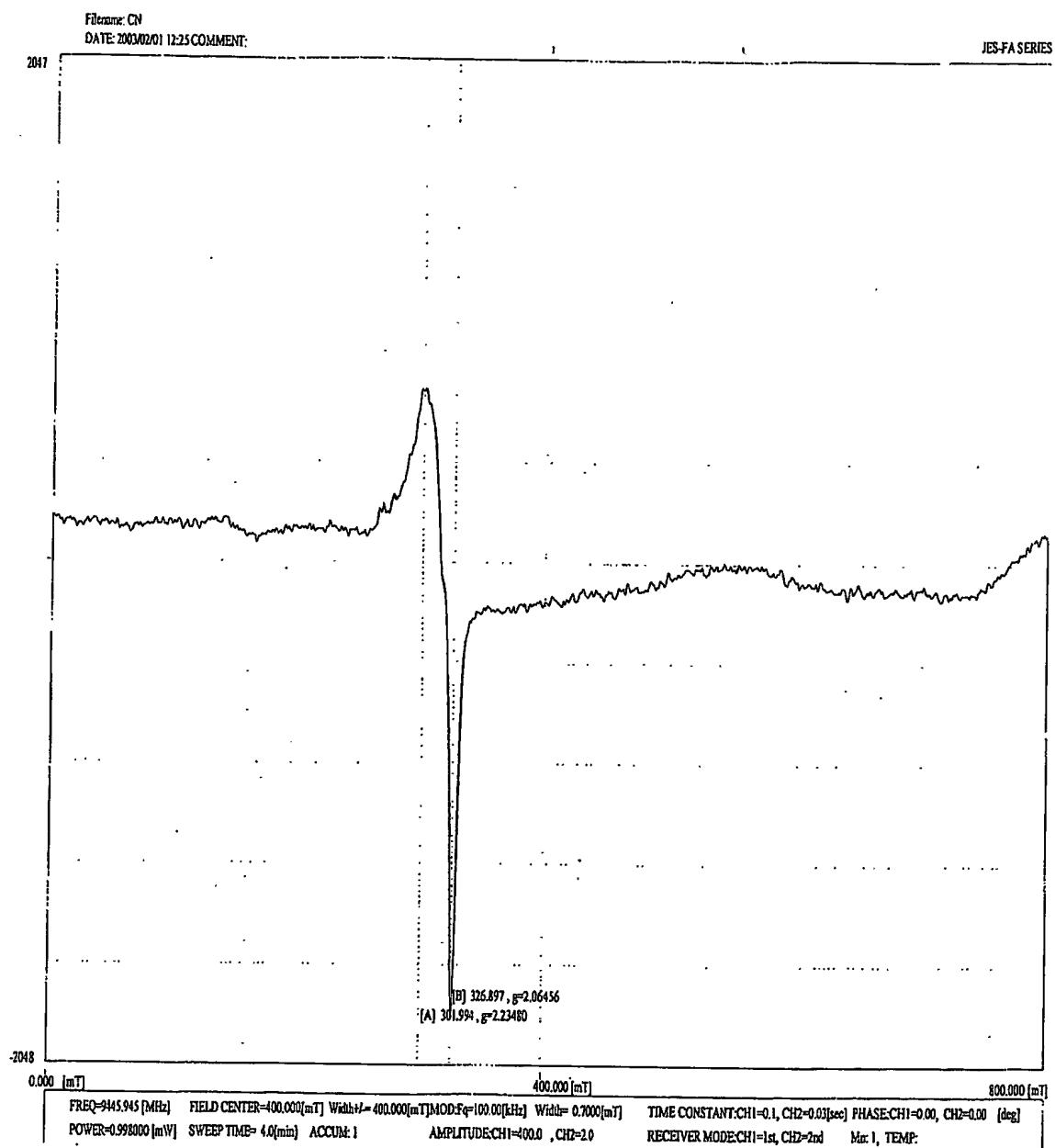


Figure 2-C

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XRD (X-ray diffraction) pattern of cupric silicate (synthesized at acidic reaction conditions and at higher temperature  $70^0\text{C}$  to  $90^0\text{C}$ ).

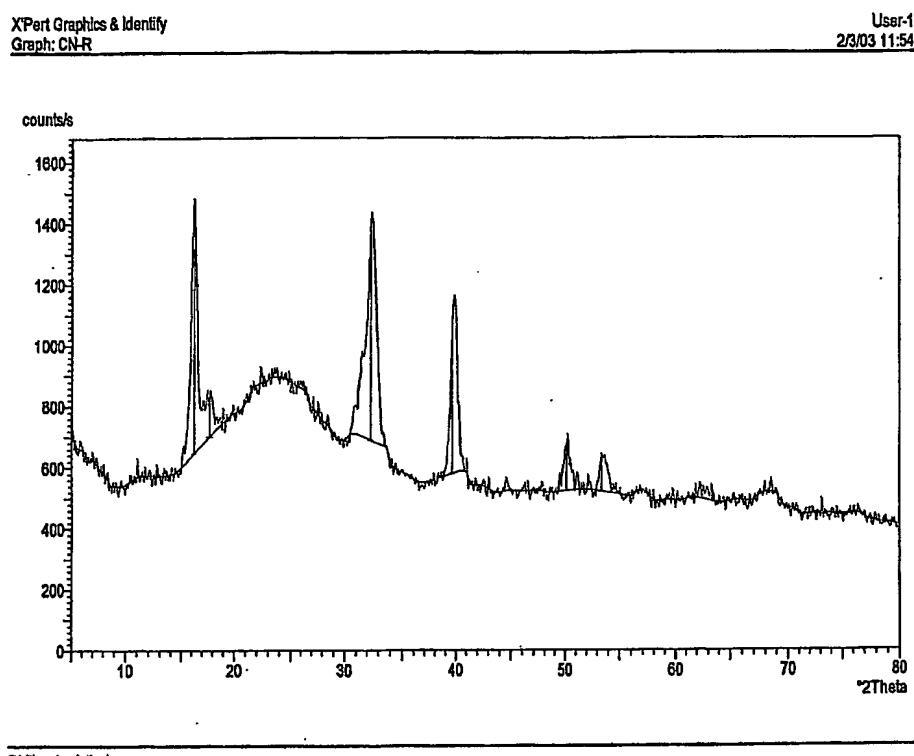


Figure 2-C

XRD (X-ray diffraction) pattern of cupric silicate (synthesized at acidic reaction conditions and at higher temperature 70<sup>0</sup>C to 90<sup>0</sup>C).

<u>X'Pert Graphics &amp; Identify</u> <u>(searched) peak list: CN-R 2</u>		User-1				
		2/3/03 11:54				
Original scan: CN-R	Date: 2/2/03 16:09					
Description of scan:						
Used wavelength:	K-Alpha1					
K-Alpha1 wavelength (Å):	1.54056					
K-Alpha2 wavelength (Å):	1.54439					
K-Alpha2/K-Alpha1 intensity ratio :	0.50000					
K-Alpha wavelength (Å):	1.54056					
K-Beta wavelength (Å):	1.39222					
Peak search parameter set:	<b>As Measured Intensities</b>					
Set created:	1/8/03 13:03					
Peak positions defined by:	Minimum of 2nd derivative					
Minimum peak tip width ("2Theta):	0.00					
Minimum peak tip width ("2Theta):	1.00					
Peak base width ("2Theta):	2.00					
Minimum significance:	0.60					
d-spacing	Relative Intensity (%)	Angle ("2Theta)	Peak Height (counts/s)	Background (counts/s)	Tip Width ("2Theta)	Significance
(Å)						
5.46662	100.00	16.20057	835.63	647.06	0.40000	5.94
5.01048	15.55	17.68674	129.92	702.61	0.64000	0.71
2.77436	84.58	32.23910	706.74	690.34	0.40000	3.61
2.27354	60.14	39.57159	502.52	580.44	0.56000	8.46
1.82094	18.29	50.04991	152.83	524.53	0.40000	0.90
1.71674	13.71	53.31888	114.53	522.91	0.40000	0.62
1.46762	5.69	63.31614	47.53	489.95	0.28000	0.60

Figure 3-A:

Composition analysis of cupric silicate (synthesized at neutral (pH 6-7) reaction conditions) using EDAX attached to SEM (Scanning Electron Microscope).

Weight % by Element

Filename	o k	NaK	Sik	C1K	CuK
VI.spc	49.47	1.06	22.59	4.27	22.62

Atomic % by Element

Filename	o k	NaK	Sik	C1K	CuK
VI.spc	69.98	1.04	18.20	2.73	8.06

Figure 3-B

ESR (Electron spin resonance) spectrometer analysis of cupric silicate (synthesized at neutral (pH 6-7) reaction conditions).

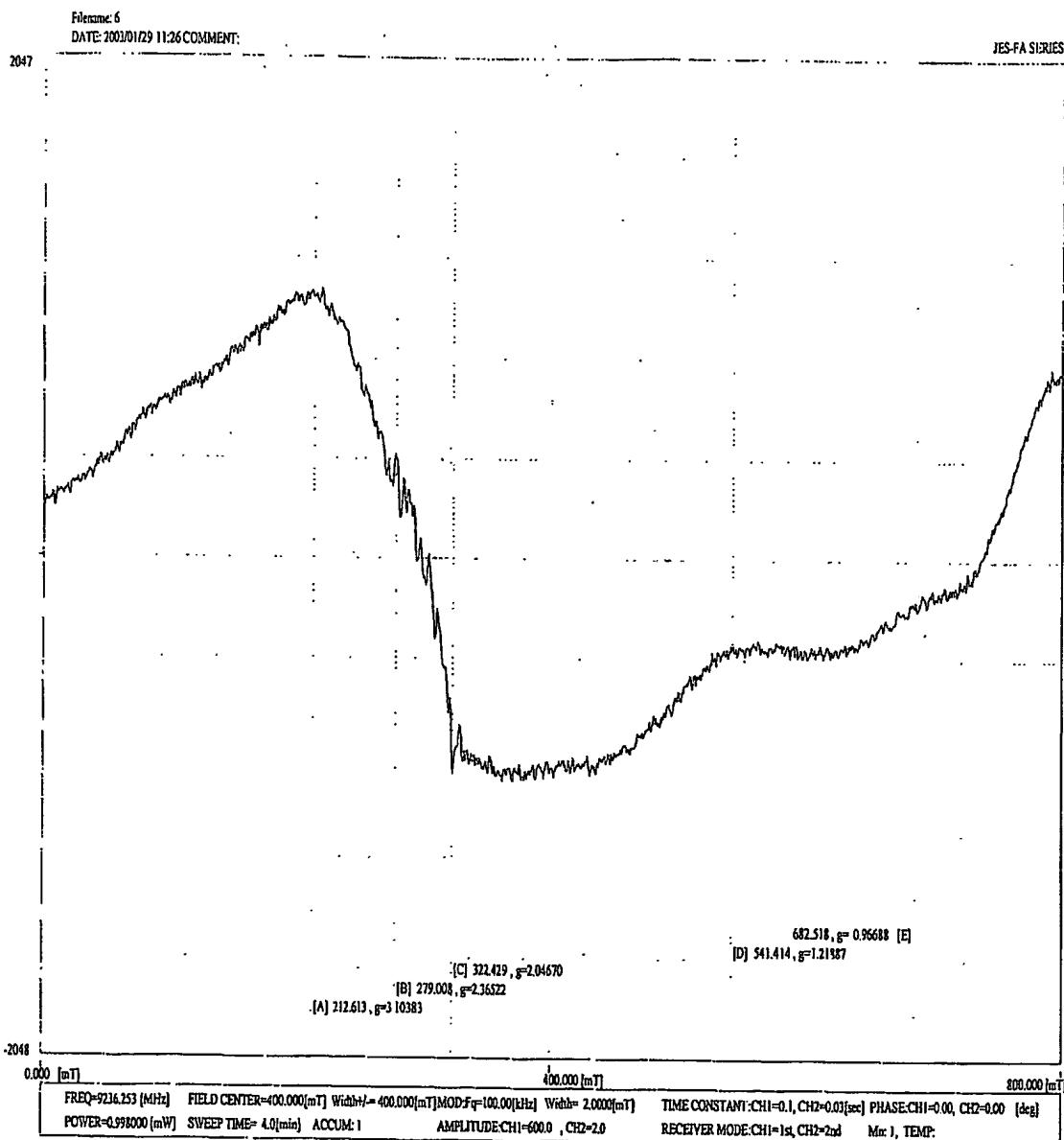


Figure 3-C

XRD (X-ray diffraction) pattern of cupric silicate (synthesized at neutral (pH 6-7) reaction conditions).

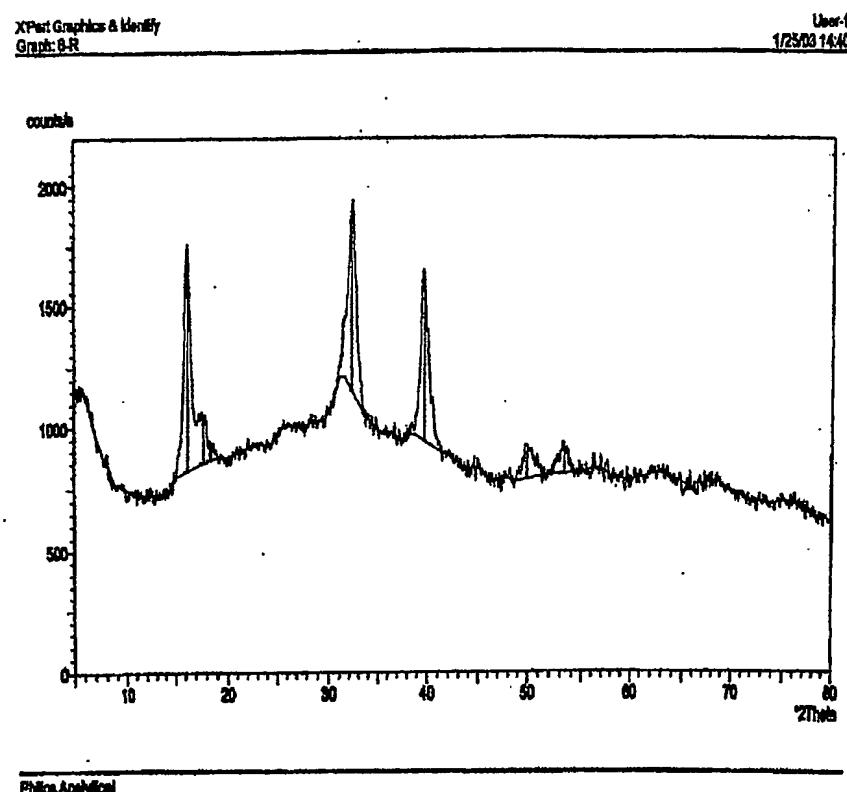


Figure 3-C

XRD (X-ray diffraction) pattern of cupric silicate (synthesized at neutral (pH 6-7) reaction conditions).

X'Pert Graphics & Identify  
(searched) peak list: 6-R 2

User-1  
1/25/03 14:41

Original scan: 6-R  
Description of scan:

Date: 1/25/03 11:54

Used wavelength: K-Alpha1  
 K-Alpha1 wavelength (Å): 1.54056  
 K-Alpha2 wavelength (Å): 1.54439  
 K-Alpha2/K-Alpha1 intensity ratio : 0.50000  
 K-Alpha wavelength (Å): 1.54056  
 K-Beta wavelength (Å): 1.39222

Peak search parameter set:  
 Set created: 1/8/03 13:03  
 Peak positions defined by: Minimum of 2nd derivative  
 Minimum peak tip width (°2Theta): 0.00  
 Minimum peak tip width (°2Theta): 1.00  
 Peak base width (°2Theta): 2.00  
 Minimum significance: 0.60

d-spacing (Å)	Relative Intensity (%)	Angle (°2Theta)	Peak Height (counts/s)	Background (counts/s)	Tip Width (°2Theta)	Significance
5.46823	100.00	16.19577	940.90	822.33	0.44000	5.24
4.99966	19.39	17.72532	182.41	854.59	0.64000	0.74
2.76987	81.24	32.29276	764.43	1159.63	0.36000	2.79
2.26420	73.85	39.77809	694.85	945.62	0.36000	2.83
1.82157	14.47	50.03142	136.11	789.55	0.48000	0.76
1.71307	10.80	.53.44225	101.61	812.60	0.80000	1.14

## Figure 4-A:

Composition analysis of cupric silicate (synthesized at basic (pH 10-11) reaction conditions) using EDAX attached to SEM (Scanning Electron Microscope).

## Weight % by Element

Filenames	o k	NaK	Sik	CuK
VII.spc	54.33	0.44	24.65	20.58

## Atomic % by Element

Filenames	o k	NaK	Sik	CuK
VII.spc	73.56	0.41	19.01	7.02

Figure 4-B

ESR (Electron spin resonance) spectrometer analysis of cupric silicate (synthesized at basic (pH 10-11) reaction conditions).

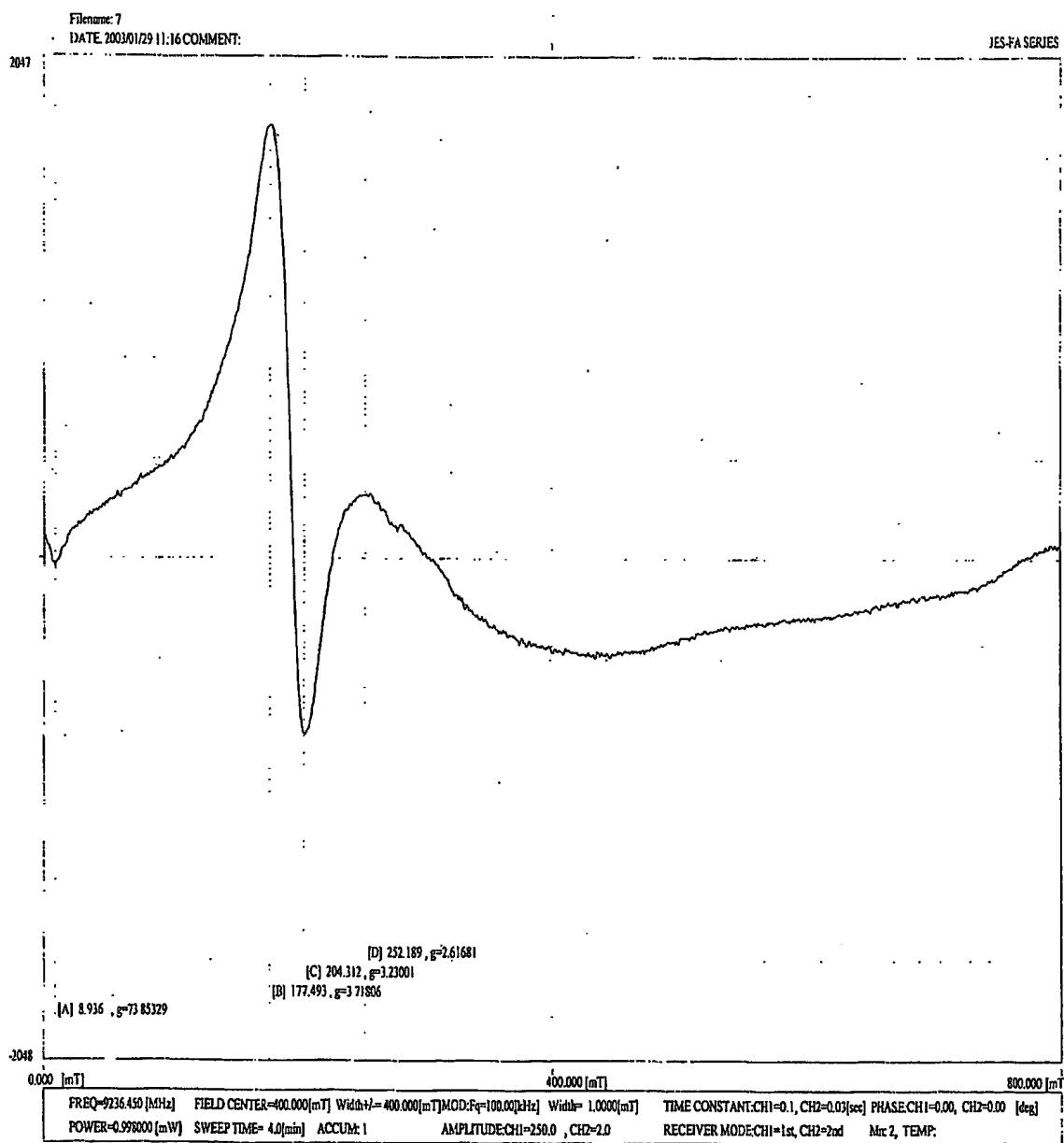


Figure 4-C

XRD (X-ray diffraction) pattern of cupric silicate (synthesized at basic (pH 10-11) reaction conditions).

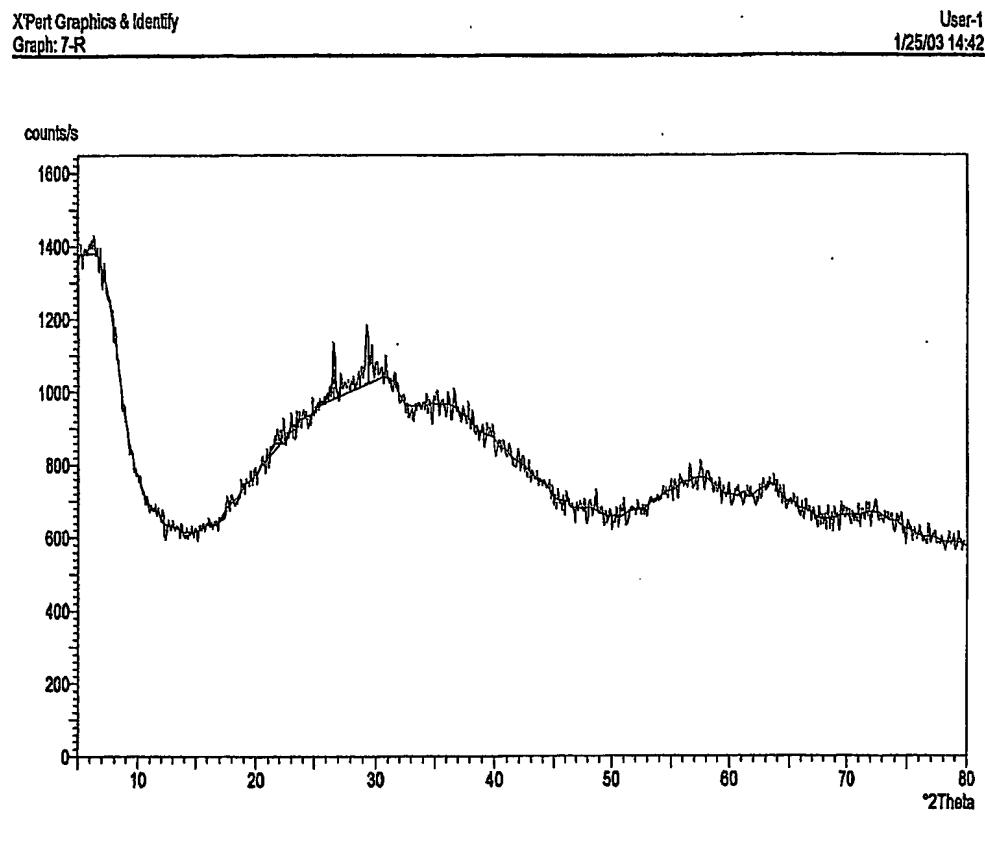


Figure 4-C

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XRD (X-ray diffraction) pattern of cupric silicate (synthesized at basic (pH 10-11) reaction conditions).

X'Pert Graphics & Identify <u>(searched) peak list: 7-R 2</u>		User-1				
Original scan: 7-R	Date: 1/25/03 12:44	1/25/03 14:42				
Used wavelength:	K-Alpha1					
K-Alpha1 wavelength (Å):	1.54056					
K-Alpha2 wavelength (Å):	1.54439					
K-Alpha2/K-Alpha1 intensity ratio :	0.50000					
K-Alpha wavelength (Å):	1.54056					
K-Beta wavelength (Å):	1.39222					
Peak search parameter set:	As Measured Intensities					
Set created:	1/8/03 13:03					
Peak positions defined by:	Minimum of 2nd derivative					
Minimum peak tip width (^°2Theta):	0.00					
Minimum peak tip width (^°2Theta):	1.00					
Peak base width (^°2Theta):	2.00					
Minimum significance:	0.60					
d-spacing	Relative Intensity (%)	Angle (^°2Theta)	Peak Height (counts/s)	Background (counts/s)	Tip Width (^°2Theta)	Significance
(Å)	(%)					
4.01966	16.81	22.09561	25.68	860.24	0.96000	0.66
3.34217	100.00	26.64983	152.74	982.28	0.20000	0.78
3.03278	66.38	29.42686	101.40	1024.95	0.48000	0.63

Figure 5-A:

Composition analysis of cupric silicate (synthesized at extreme acidic reaction conditions (below pH 2) by addition of 10 ml HCl ) using EDAX attached to SEM (Scanning Electron Microscope).

## Weight % by Element

Filenames	o k	NaK	Sik	ClK	CuK
c10.spc	45.69	1.06	32.63	3.30	17.33

## Atomic % by Element

Filenames	o k	NaK	Sik	ClK	CuK
c10.spc	64.47	1.04	26.23	2.10	6.16

Figure 5-B

ESR (Electron spin resonance) spectrometer analysis of cupric silicate (synthesized at extreme acidic reaction conditions (below pH 2) by addition of 10 ml HCl ).

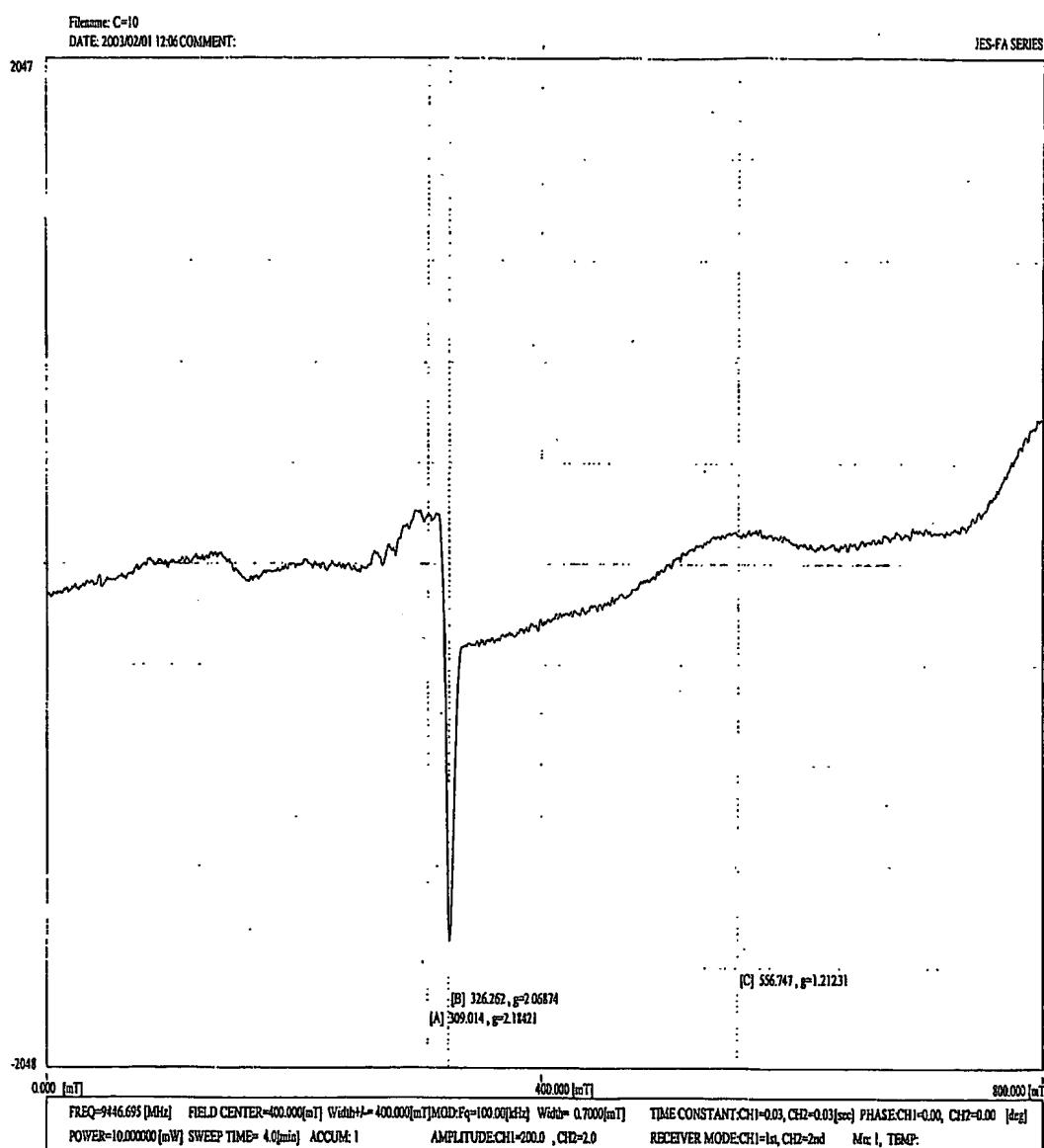


Figure 5-C

XRD (X-ray diffraction) pattern of cupric silicate ( synthesized at extreme acidic reaction conditions (below pH 2) by addition of 10 ml HCl ).

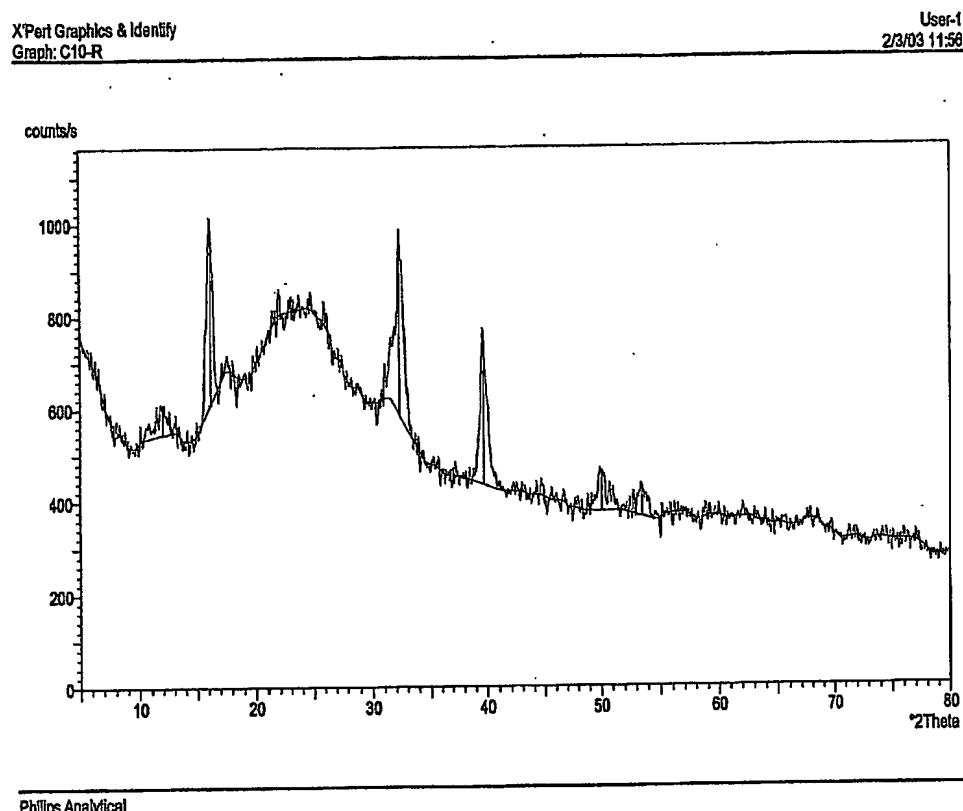


Figure 5-C

XRD (X-ray diffraction) pattern of cupric silicate (synthesized at extreme acidic reaction conditions (below pH 2) by addition of 10 ml HCl).

X'Pert Graphics & Identify (searched) peak list: C10-R 2		User-1 2/3/03 11:56				
Original scan: C10-R	Date: 2/2/03 15:13					
Description of scan:						
Used wavelength:	K-Alpha1					
K-Alpha1 wavelength (Å):	1.54056					
K-Alpha2 wavelength (Å):	1.54439					
K-Alpha2/K-Alpha1 intensity ratio :	0.50000					
K-Alpha wavelength (Å):	1.54056					
K-Beta wavelength (Å):	1.39222					
Peak search parameter set:	As Measured Intensities					
Set created:	1/8/03 13:03					
Peak positions defined by:	Minimum of 2nd derivative					
Minimum peak tip width (^2Theta):	0.00					
Minimum peak tip width (^2Theta):	1.00					
Peak base width (^2Theta):	2.00					
Minimum significance:	0.60					
d-spacing	Relative Intensity (%)	Angle (^2Theta)	Peak Height (counts/s)	Background (counts/s)	Tip Width (^2Theta)	Significance
(Å)						
7.39149	15.98	11.96350	64.02	545.13	0.80000	0.73
5.46724	100.00	16.19872	400.70	610.14	0.32000	2.15
2.77097	98.52	32.27956	394.77	587.64	0.20000	0.79
2.26751	82.36	39.71761	330.02	436.05	0.28000	1.67
1.82010	20.70	50.07447	82.93	377.75	0.48000	0.98
1.71117	15.69	53.50644	62.86	365.08	0.80000	0.92

Figure 6-A:

Composition analysis of cupric silicate (synthesized at extreme acidic reaction conditions (below pH 2) by addition of 20 ml HCl ) using EDAX attached to SEM (Scanning Electron Microscope).

Weight % by Element

Filenames	o k	NaK	Sik	C1K	CuK
c20.spc	52.91	0.60	33.23	1.92	11.34

Atomic % by Element

Filenames	o k	NaK	Sik	C1K	CuK
c20.spc	69.64	0.55	24.91	1.14	3.76

Figure 6-B

ESR (Electron spin resonance) spectrometer analysis of cupric silicate (synthesized at extreme acidic reaction conditions (below pH 2) by addition of 20 ml HCl ).

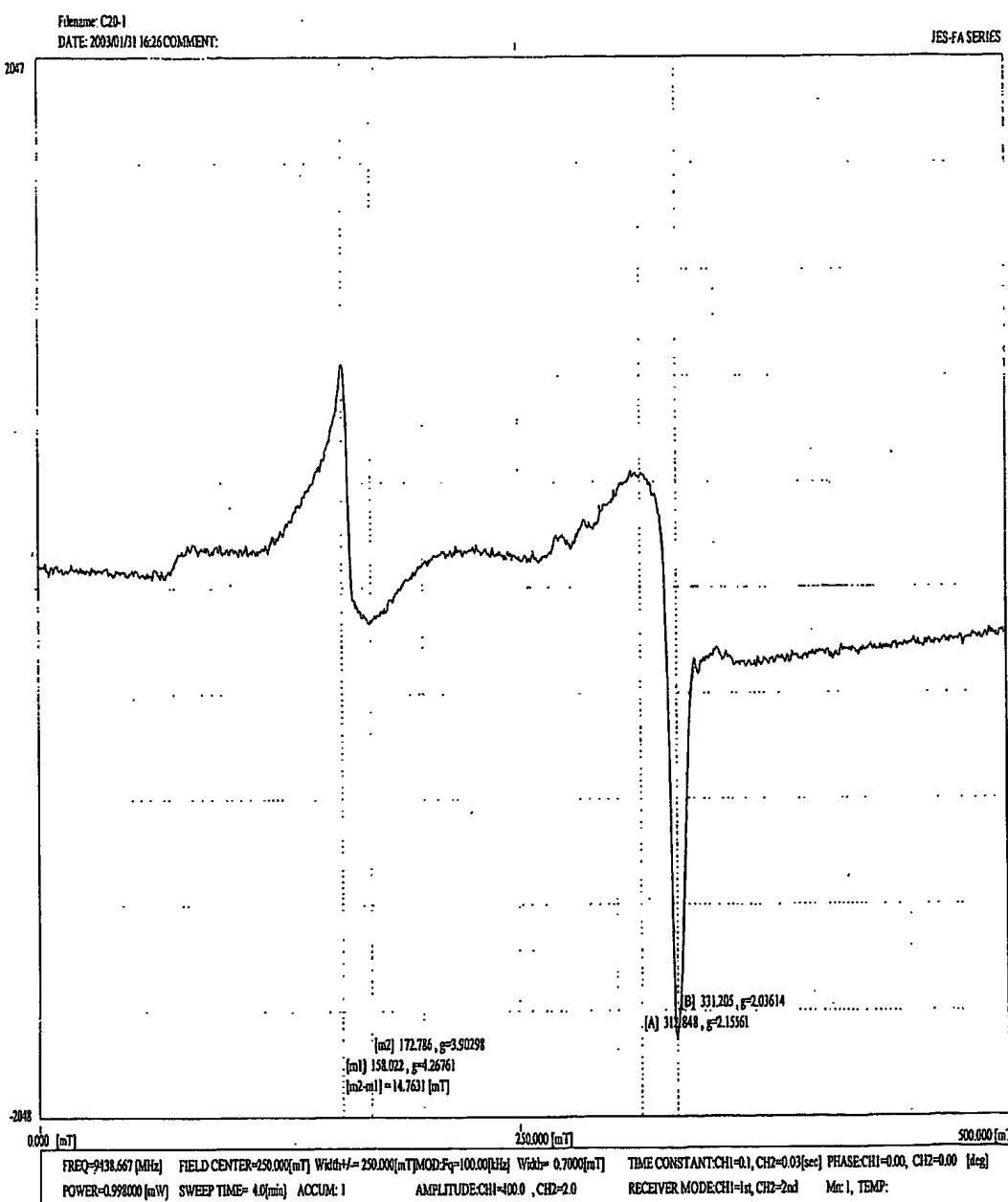


Figure 6-C

XRD (X-ray diffraction) pattern of cupric silicate (synthesized at extreme acidic reaction conditions (below pH 2) by addition of 20 ml HCl).

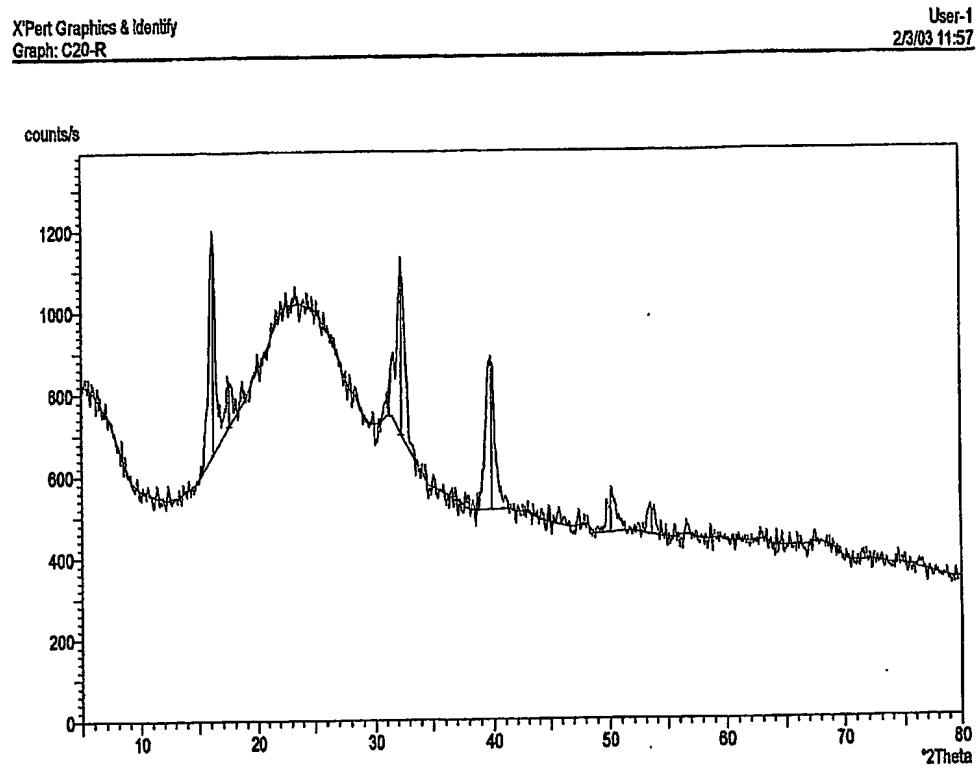


Figure 6-C

XRD (X-ray diffraction) pattern of cupric silicate (synthesized at extreme acidic reaction conditions (below pH 2) by addition of 20 ml HCl ).

X'Pert Graphics & Identify (searched) peak list: C20-R 2		User-1				
Original scan: C20-R	Date: 2/2/03 14:43	2/3/03 11:57				
Description of scan:						
Used wavelength:	K-Alpha1					
K-Alpha1 wavelength (Å):	1.54056					
K-Alpha2 wavelength (Å):	1.54439					
K-Alpha2/K-Alpha1 intensity ratio :	0.50000					
K-Alpha wavelength (Å):	1.54056					
K-Beta wavelength (Å):	1.39222					
Peak search parameter set:	As Measured Intensities					
Set created:	1/8/03 13:03					
Peak positions defined by:	Minimum of 2nd derivative					
Minimum peak tip width (^2Theta):	0.00					
Minimum peak tip width (^2Theta):	1.00					
Peak base width (^2Theta):	2.00					
Minimum significance:	0.60					
d-spacing	Relative Intensity (%)	Angle (^2Theta)	Peak Height (counts/s)	Background (counts/s)	Tip Width (^2Theta)	Significance
(Å)						
5.44576	100.00	16.26305	541.23	653.67	0.20000	0.71
5.03216	19.73	17.60991	106.76	721.64	0.48000	0.77
2.76378	76.53	32.36589	414.21	698.97	0.56000	3.99
2.26021	67.52	39.85131	365.45	515.17	0.56000	4.06
2.01957	7.07	44.84173	38.28	483.78	0.24000	0.70
1.82106	15.18	50.04628	82.15	457.19	0.64000	0.84
1.71148	11.43	53.49579	61.84	451.40	0.80000	1.24

Figure 7-A:

Composition analysis of zinc silicate (synthesized at neutral (pH 6-7) reaction conditions) using EDAX attached to SEM (Scanning Electron Microscope).

Weight % by Element

Filenames	O K	Sik	ClK	ZnK
nine.spc	35.71	4.89	0.08	59.32

Atomic % by Element

Filenames	O K	Sik	ClK	ZnK
nine.spc	67.32	5.25	0.06	27.37

Figure 7-B

ESR (Electron spin resonance) spectrometer analysis of zinc silicate (synthesized at neutral (pH 6-7) reaction conditions).

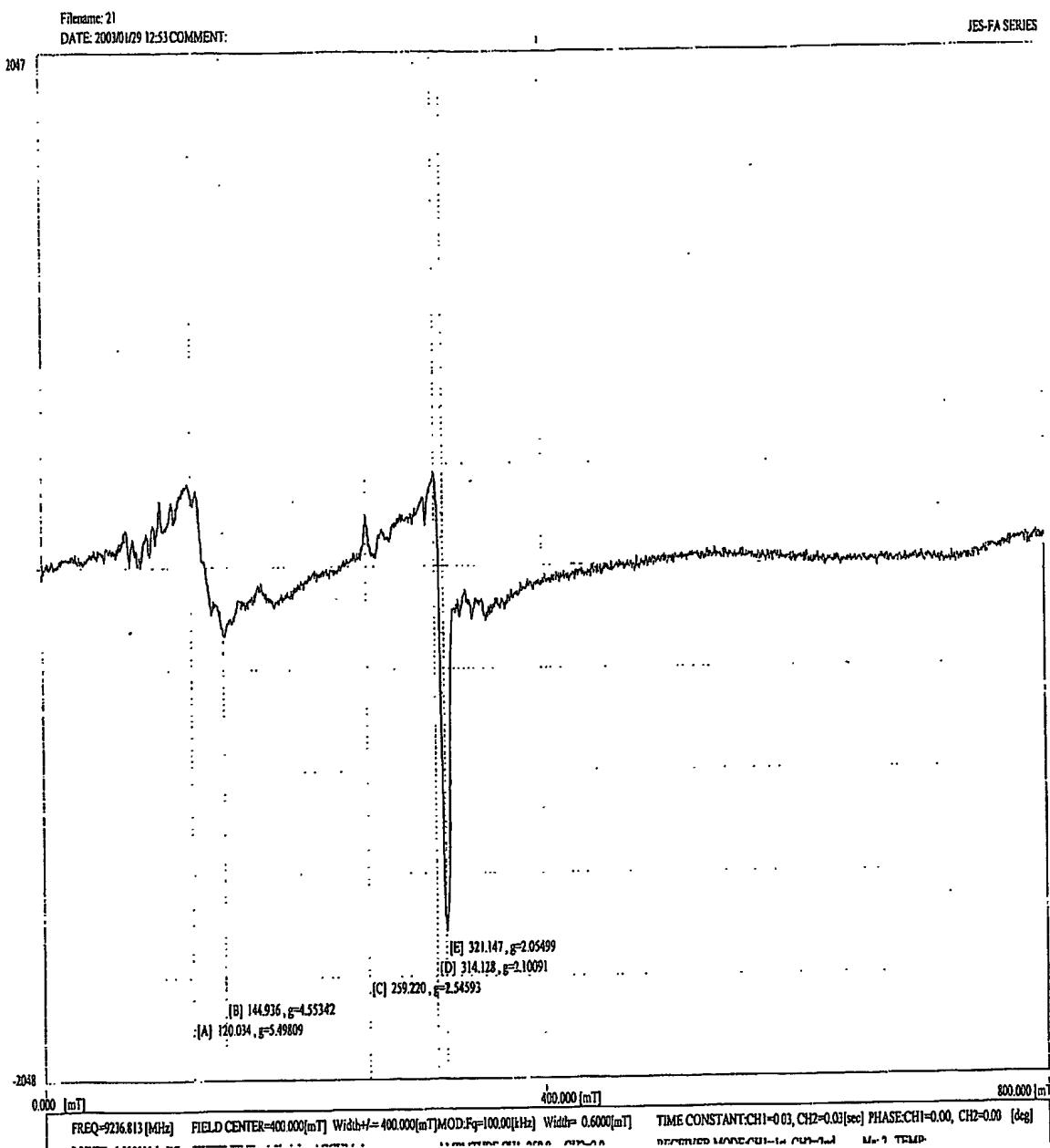


Figure 7-C

XRD (X-ray diffraction) pattern of zinc silicate (synthesized at neutral (pH 6-7) reaction conditions).

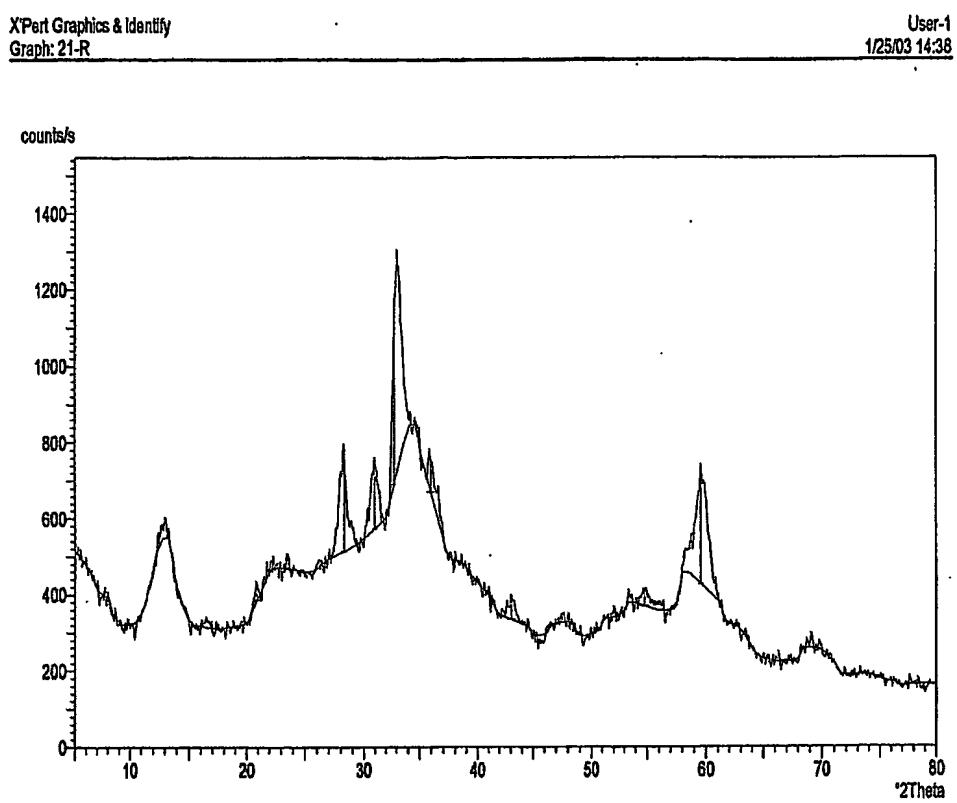


Figure 7-C

XRD (X-ray diffraction) pattern of zinc silicate (synthesized at neutral (pH 6-7) reaction conditions).

X'Pert Graphics & Identify (searched) peak list: 21-R 2		User-1 1/25/03 14:39				
Original scan: 21-R	Date: 1/25/03 13:25					
Description of scan:						
Used wavelength:	K-Alpha1					
K-Alpha1 wavelength (Å):	1.54056					
K-Alpha2 wavelength (Å):	1.54439					
K-Alpha2/K-Alpha1 intensity ratio :	0.50000					
K-Alpha wavelength (Å):	1.54056					
K-Beta wavelength (Å):	1.39222					
Peak search parameter set:	As Measured Intensities					
Set created:	1/8/03 13:03					
Peak positions defined by:	Minimum of 2nd derivative					
Minimum peak tip width (°2Theta):	0.00					
Minimum peak tip width (°2Theta):	1.00					
Peak base width (°2Theta):	2.00					
Minimum significance:	0.60					
d-spacing	Relative Intensity (%)	Angle (°2Theta)	Peak Height (counts/s)	Background (counts/s)	Tip Width (°2Theta)	Significance
(Å)						
4.24766	9.82	20.89591	43.60	386.64	0.48000	0.85
3.15351	59.30	28.27636	263.36	514.45	0.48000	1.66
2.88286	40.51	30.99464	179.93	574.24	0.40000	0.76
2.73150	100.00	32.75904	444.15	691.51	0.28000	0.83
2.49483	21.20	35.96794	94.17	671.04	0.64000	0.70
2.09711	13.25	43.09916	58.83	334.47	0.64000	0.73
1.67436	9.61	54.77999	42.67	370.46	0.64000	0.92
1.55031	69.13	59.58455	307.02	427.76	0.40000	0.84

## Figure 8-A:

Composition analysis of zinc silicate (synthesized at extreme acidic (below pH2) reaction conditions) using EDAX attached to SEM (Scanning Electron Microscope).

## Weight % by Element

Filenames	o k	ZnL	NaK	Sik	ClK
zinc-10.spc	35.59	41.94	0.00	17.04	5.43

## Atomic % by Element

Filenames	o k	ZnL	NaK	Sik	ClK
zinc-10.spc	61.35	17.69	0.00	16.73	4.22

Figure 8-B

ESR (Electron spin resonance) spectrometer analysis of zinc silicate (synthesized at extreme acidic (below pH2) reaction conditions).

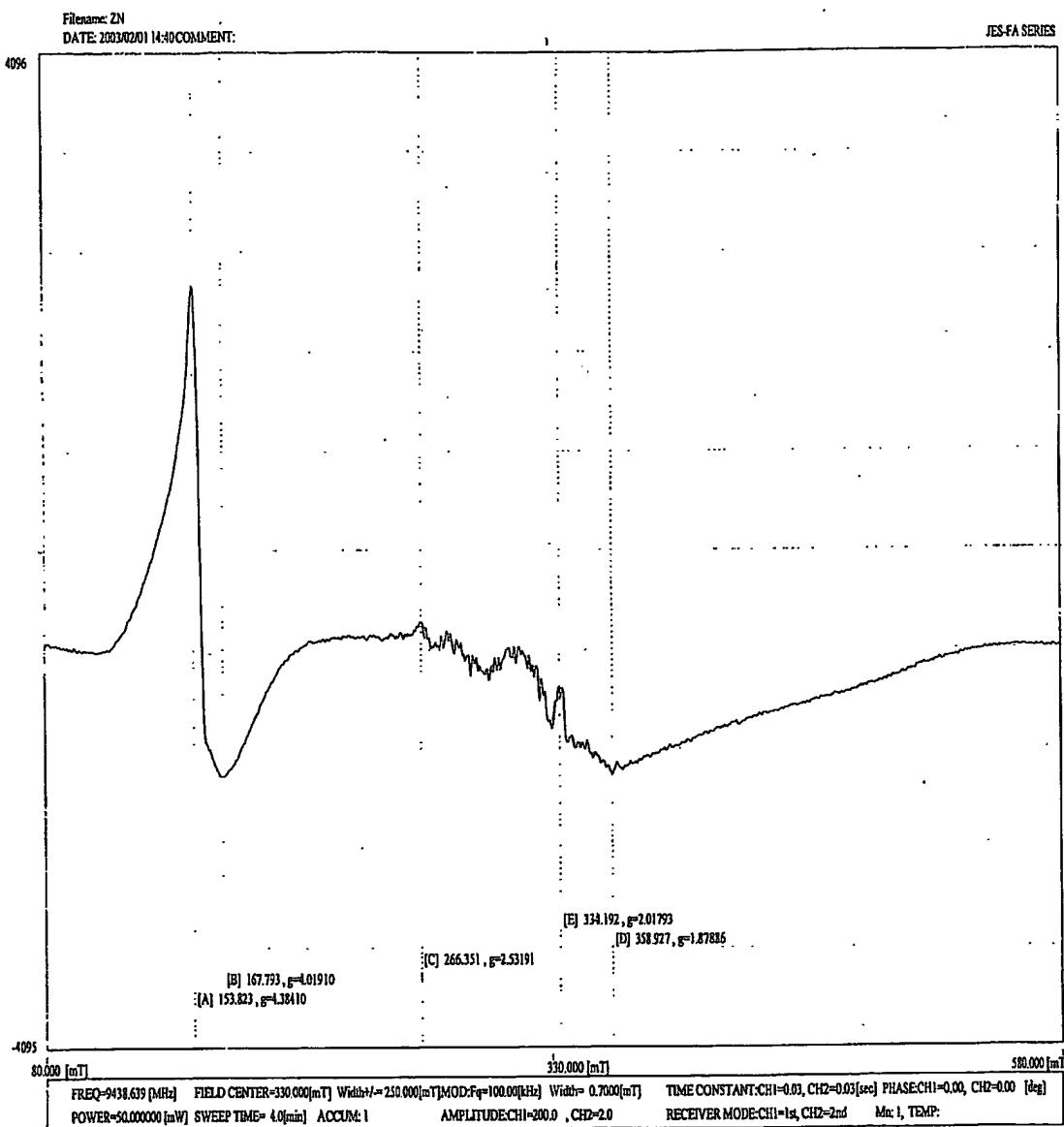


Figure 8-B

ESR (Electron spin resonance) spectrometer analysis of zinc silicate (synthesized at extreme acidic (below pH2) reaction conditions).

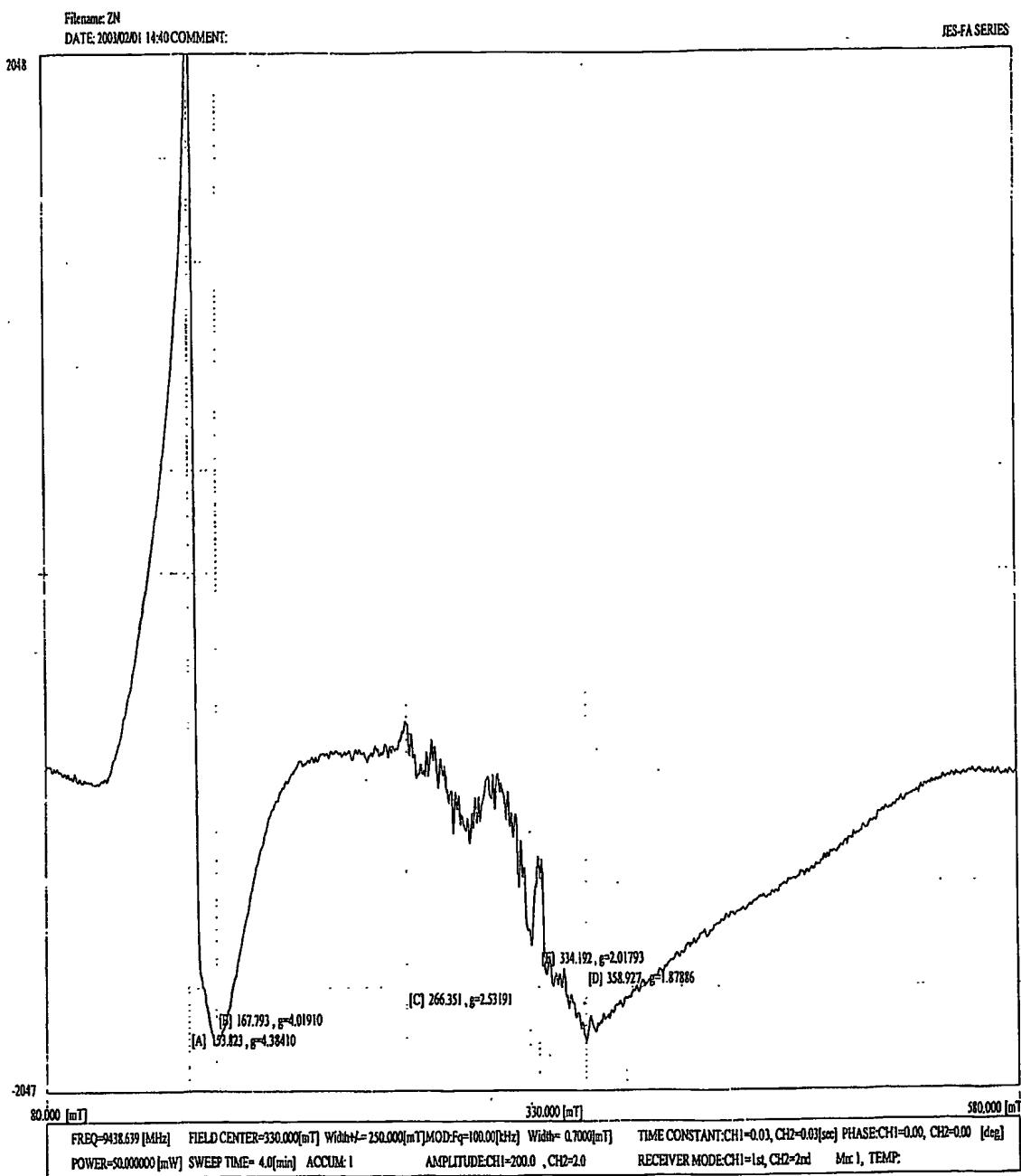


Figure 8-C

XRD (X-ray diffraction) pattern of zinc silicate (synthesized at extreme acidic (below pH2) reaction conditions).

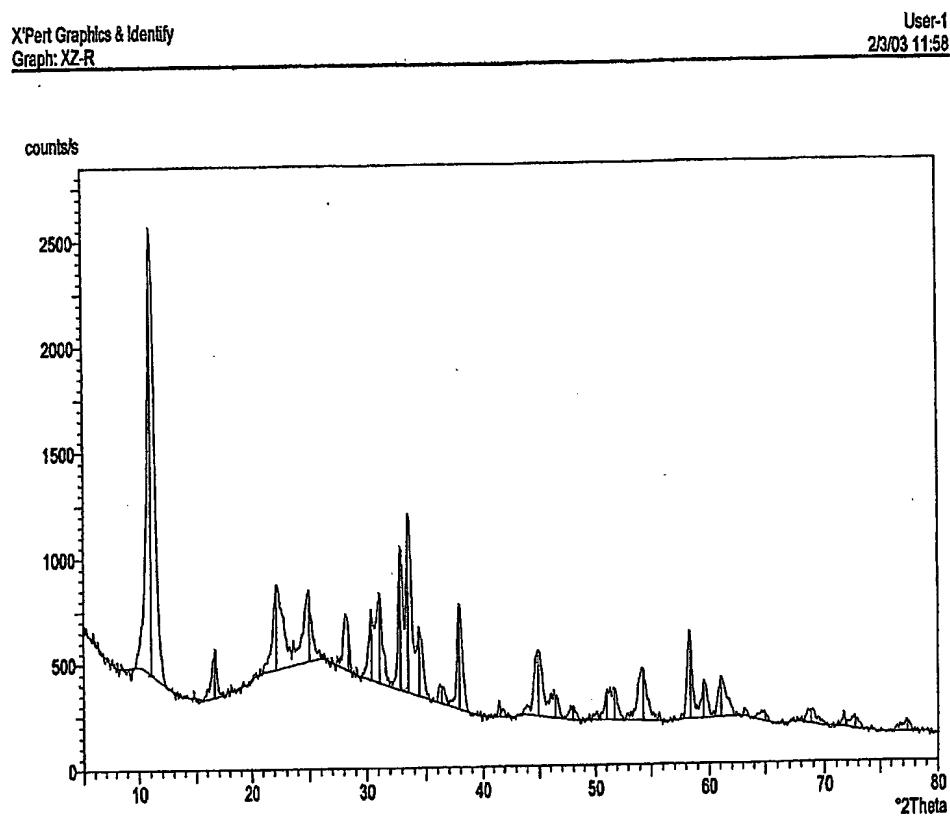


Figure 8-C

XRD (X-ray diffraction) pattern of zinc silicate (synthesized at extreme acidic (below pH2) reaction conditions).

X'Pert Graphics & Identify (searched) Peak list: XZ-R 2		User-1 2/3/03 11:58				
Original scan: XZ-R	Date: 2/1/03 18:50					
Description of scan:						
Used wavelength:	K-Alpha1					
K-Alpha1 wavelength (Å):	1.54056					
K-Alpha2 wavelength (Å):	1.54439					
K-Alpha2/K-Alpha1 intensity ratio :	0.50000					
K-Alpha wavelength (Å):	1.54056					
K-Beta wavelength (Å):	1.39222					
Peak search parameter set:	As Measured Intensities					
Set created:	1/8/03 13:03					
Peak positions defined by:	Minimum of 2nd derivative					
Minimum peak tip width ("2Theta):	0.00					
Minimum peak tip width ("2Theta):	1.00					
Peak base width ("2Theta):	2.00					
Minimum significance:	0.60					
d-spacing	Relative Intensity (%)	Angle ("2Theta)	Peak Height (counts/s)	Background (counts/s)	Tip Width ("2Theta)	Significance
(Å)						
7.98264	100.00	11.07467	2079.88	453.30	0.48000	16.11
5.33677	10.63	16.39748	221.17	343.67	0.32000	1.31
4.00484	19.52	22.17845	406.04	474.57	0.28000	0.97
3.56647	16.16	24.94587	336.14	510.88	0.24000	1.03
3.14366	10.46	28.36683	217.55	465.82	0.48000	4.05
2.93766	15.03	30.40232	312.67	418.68	0.24000	1.39
2.86706	20.14	31.16978	418.81	403.81	0.32000	1.18
2.72163	31.97	32.88120	664.98	370.63	0.32000	4.93
2.67080	40.17	33.52527	835.44	358.14	0.36000	7.23
2.60200	15.53	34.43904	322.95	340.43	0.24000	0.93
2.46786	3.83	36.37469	79.68	303.54	0.32000	1.82
2.37176	23.66	37.90343	492.02	275.31	0.36000	4.69
2.16675	2.30	41.64812	47.90	237.27	0.48000	0.80
2.01636	14.86	44.91711	308.99	237.75	0.64000	5.99
1.95400	4.79	46.43299	99.53	226.89	0.72000	2.14
1.89620	2.90	47.93553	60.26	216.13	0.64000	1.07
1.78961	6.59	50.98829	136.97	214.24	0.40000	0.92
1.76470	6.90	51.76088	143.48	213.02	0.32000	0.65
1.68726	11.52	54.32631	239.59	208.98	0.32000	1.25
1.57830	19.87	58.42442	413.19	213.32	0.40000	6.07
1.55167	7.86	59.52677	163.47	215.82	0.24000	0.83
1.51555	8.99	61.09471	186.93	219.37	0.32000	1.26
1.43353	1.90	65.00406	39.44	195.08	0.56000	0.61
1.36374	2.96	68.78101	61.53	182.93	0.64000	0.99
1.29976	2.39	72.68780	49.61	155.06	0.64000	0.68
1.23245	2.46	77.36409	51.16	187.24	0.48000	0.76

Figure 9-A:

Composition analysis of silver silicate (synthesized at neutral (pH 6-7) reaction conditions) using EDAX attached to SEM (Scanning Electron Microscope).

Weight % by Element

Filenames	o k	NaK	Sik	ClK	AgL
Silver5.spc	29.55	0.56	2.63	15.79	51.47

Atomic % by Element

Filenames	o k	NaK	Sik	ClK	AgL
Silver5.spc	63.96	0.85	3.25	15.42	16.52

Figure 9-B

ESR (Electron spin resonance) spectrometer analysis of silver silicate (synthesized at neutral (pH 6-7) reaction conditions).

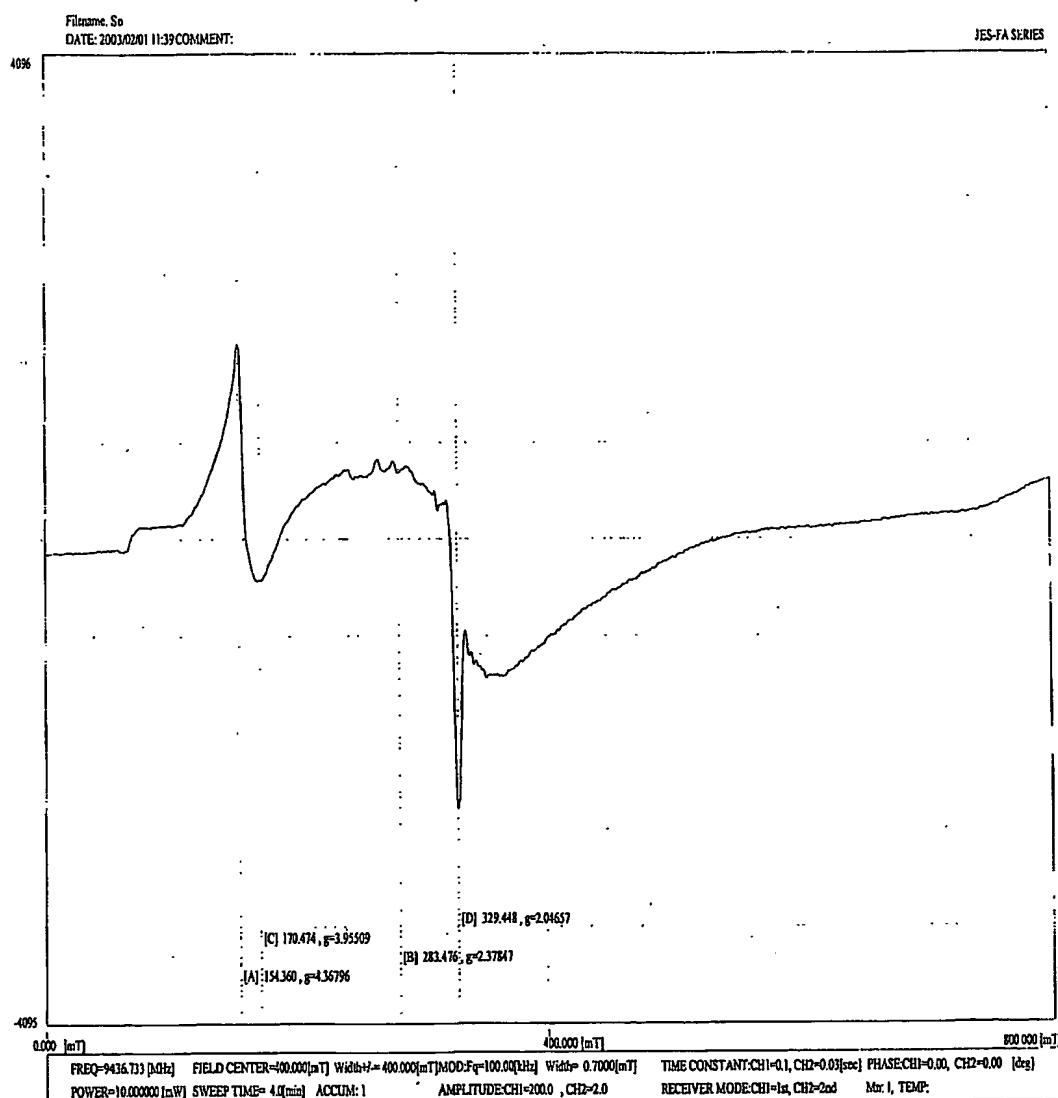
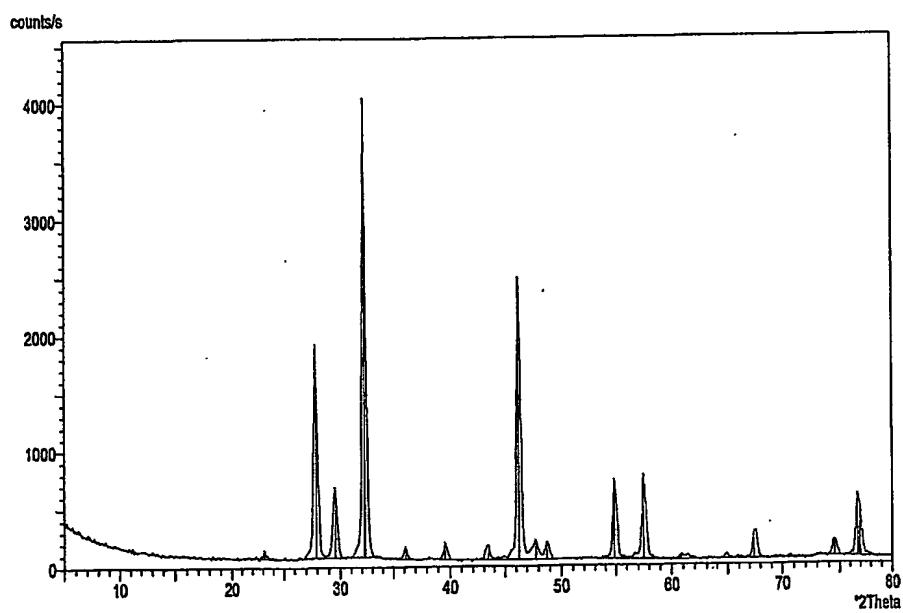


Figure 9-C

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XRD (X-ray diffraction) pattern of silver silicate (synthesized at neutral (pH 6-7) reaction conditions).

X'Pert Graphics & Identify  
Graph: So-1 User-1  
23/03 11:52



Philips Analytical

Figure 9-C

XRD (X-ray diffraction) pattern of silver silicate (synthesized at neutral (pH 6-7) reaction conditions).

X'Pert Graphics & Identify <u>(searched)</u> peak list: So-r 2		User-1 2/3/03 11:52				
Original scan: So-r		Date: 2/3/03 11:12				
Description of scan:						
Used wavelength:		K-Alpha1				
K-Alpha1 wavelength (Å):		1.54056				
K-Alpha2 wavelength (Å):		1.54439				
K-Alpha2/K-Alpha1 intensity ratio :		0.50000				
K-Alpha wavelength (Å):		1.54056				
K-Beta wavelength (Å):		1.39222				
Peak search parameter set:		As Measured Intensities				
Set created:		1/8/03 13:03				
Peak positions defined by:		Minimum of 2nd derivative				
Minimum peak tip width ("2Theta):		0.00				
Minimum peak tip width ("2Theta):		1.00				
Peak base width ("2Theta):		2.00				
Minimum significance:		0.60				
d-spacing (Å)	Relative Intensity (%)	Angle ("2Theta)	Peak Height (counts/s)	Background (counts/s)	Tip Width ("2Theta)	Significance
12.51901	0.61	7.05514	24.25	269.08	0.32000	0.75
3.84145	1.61	23.13452	63.48	84.62	0.24000	0.85
3.19616	46.53	27.89129	1835.66	84.32	0.32000	11.62
3.02038	15.33	29.55040	604.98	86.85	0.40000	10.85
2.76936	100.00	32.29885	3945.11	91.02	0.36000	24.39
2.48336	2.75	36.13978	108.38	69.78	0.20000	1.06
2.27608	3.61	39.56180	142.47	63.39	0.24000	1.46
2.08218	3.16	43.42372	124.78	58.90	0.44000	4.34
1.96033	61.37	46.27446	2421.27	59.81	0.44000	31.71
1.90300	4.13	47.75348	162.86	60.29	0.20000	0.87
1.86696	3.87	48.73456	152.60	60.60	0.28000	2.03
1.67244	17.12	54.84804	675.21	58.99	0.40000	11.19
1.60159	18.06	57.49439	712.55	55.15	0.20000	2.33
1.52203	0.97	60.80730	38.34	49.06	0.32000	0.61
1.43528	1.08	64.91550	42.68	50.99	0.28000	1.03
1.38831	5.42	67.39817	213.70	52.15	0.24000	1.32
1.27274	3.34	74.46880	139.61	66.51	0.48000	3.96
1.24157	13.09	76.69181	516.25	62.23	0.24000	2.43
1.23836	11.31	76.92707	446.10	61.78	0.16000	0.61

Figure 10-A:

Composition analysis of silver silicate (synthesized at acidic (pH 2)reaction conditions) using EDAX attached to SEM (Scanning Electron Microscope).

## Weight % by Element

Filenames	O k	NaK	Sik	ClK	AgL
Silver-4.spc	52.01	4.83	20.85	0.46	21.86

## Atomic % by Element

Filenames	O k	NaK	Sik	ClK	AgL
Silver-4.spc	73.57	4.75	16.80	0.29	4.59

Figure 10-B

ESR (Electron spin resonance) spectrometer analysis of silver silicate (synthesized at acidic (pH 2) reaction conditions).

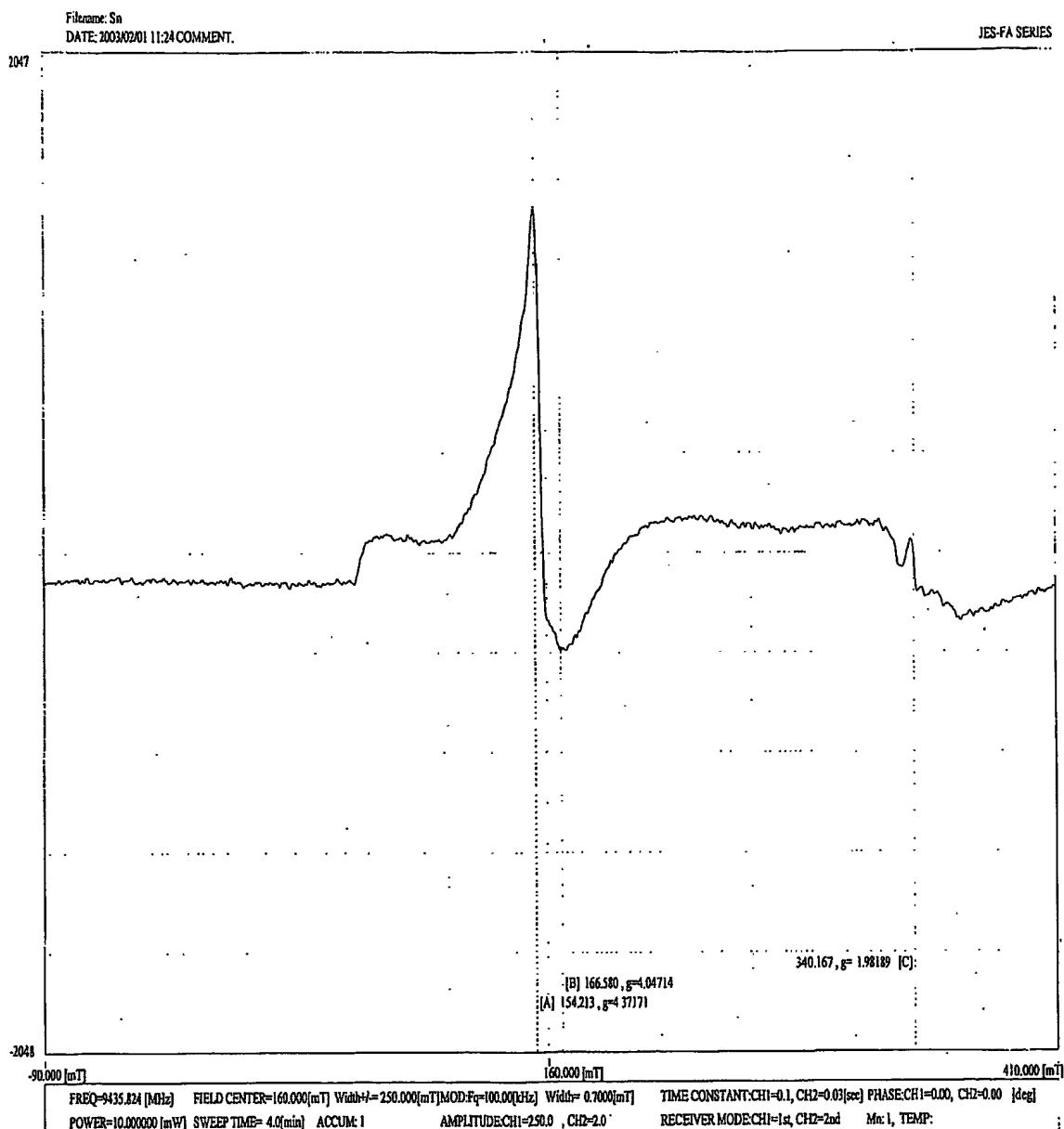


Figure 10-C

XRD (X-ray diffraction) pattern of silver silicate (synthesized at acidic (pH 2) reaction conditions).

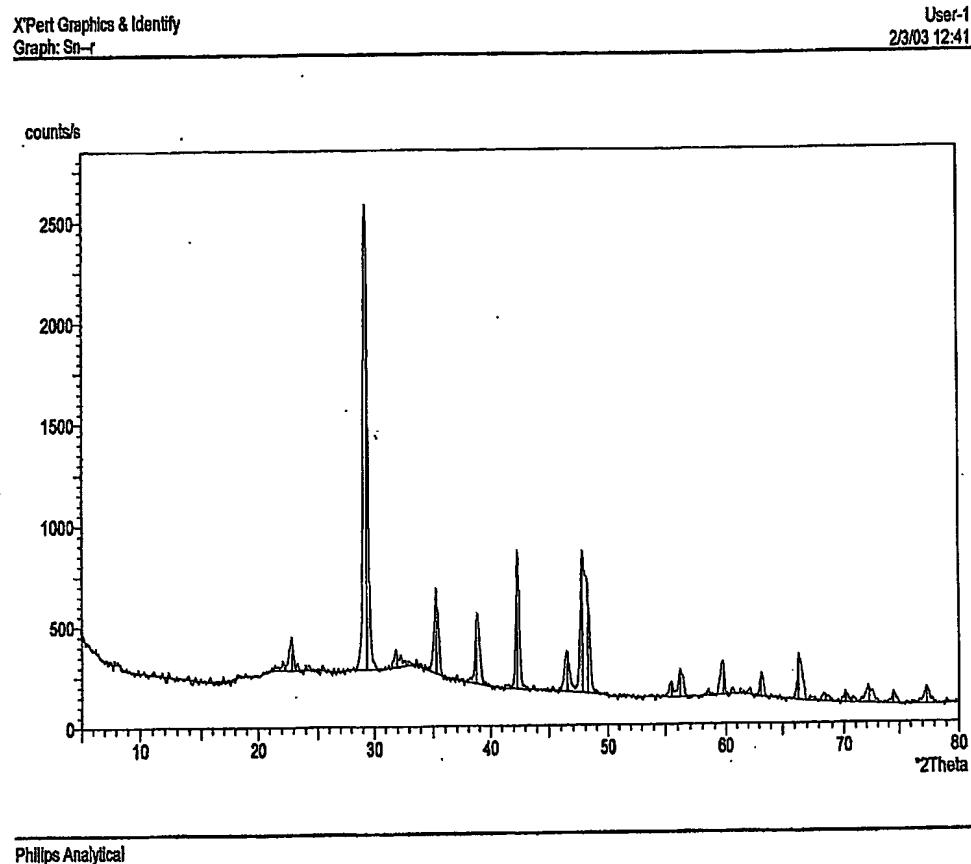


Figure 10-C

XRD (X-ray diffraction) pattern of silver silicate (synthesized at acidic (pH 2) reaction conditions).

X'Pert Graphics & Identify (searched) peak list: Sn-r 2		User-1 2/3/03 12:41				
Original scan: Sn-r	Date: 2/3/03 12:12					
Description of scan:						
Used wavelength:	K-Alpha1					
K-Alpha1 wavelength (Å):	1.54056					
K-Alpha2 wavelength (Å):	1.54439					
K-Alpha2/K-Alpha1 intensity ratio :	0.50000					
K-Alpha wavelength (Å):	1.54056					
K-Beta wavelength (Å):	1.39222					
Peak search parameter set:	As Measured Intensities					
Set created:	1/8/03 13:03					
Peak positions defined by:	Minimum of 2nd derivative					
Minimum peak tip width ("2Theta):	0.00					
Minimum peak tip width ("2Theta):	1.00					
Peak base width ("2Theta):	2.00					
Minimum significance:	0.60					
d-spacing (Å)	Relative Intensity (%)	Angle ("2Theta)	Peak Height (counts/s)	Background (counts/s)	Tip Width ("2Theta)	Significance
3.89288	7.31	22.82476	162.05	283.57	0.20000	0.84
3.04209	100.00	29.33483	2217.87	286.93	0.44000	27.45
2.80105	2.99	31.92363	66.30	297.07	0.64000	0.85
2.54412	18.81	35.24794	417.13	264.05	0.24000	2.56
2.32266	15.21	38.73633	337.42	211.76	0.32000	3.87
2.13433	30.40	42.31091	674.27	184.90	0.24000	5.12
1.95266	8.89	46.46684	197.27	168.22	0.36000	3.23
1.90573	30.86	47.68093	684.55	162.50	0.24000	2.62
1.88338	24.63	48.14670	546.21	160.31	0.32000	2.62
1.65610	3.33	55.43541	73.96	136.14	0.24000	0.81
1.63624	6.25	56.16747	138.52	134.86	0.20000	0.81
1.54698	7.23	59.72562	160.38	146.27	0.28000	2.15
1.47111	4.99	63.14884	110.71	134.86	0.32000	2.37
1.40804	10.18	66.33090	225.85	116.60	0.32000	3.21
1.36874	1.37	68.49464	30.40	107.27	0.48000	0.82
1.34028	2.30	70.15949	50.94	101.71	0.40000	1.02
1.30705	3.20	72.21879	71.02	97.84	0.64000	1.37
1.27367	2.54	74.42506	56.25	93.68	0.24000	0.67
1.23314	3.73	77.31282	82.74	91.67	0.40000	2.27

Figure 11-A:

Composition analysis of manganese silicate (synthesized at neutral (pH 6-7) reaction conditions) using EDAX attached to SEM (Scanning Electron Microscope).

Weight % by Element

Filenames	O K	NaK	Sik	C1K	MnK
Manganese-o	142.30	1.03	19.11	0.43	37.14

Atomic % by Element

Filenames	O K	NaK	Sik	C1K	MnK
Manganese-o	165.17	1.10	16.77	0.30	16.66

Figure 11-B

ESR (Electron spin resonance) spectrometer analysis of manganese silicate (synthesized at neutral (pH 6-7) reaction conditions).

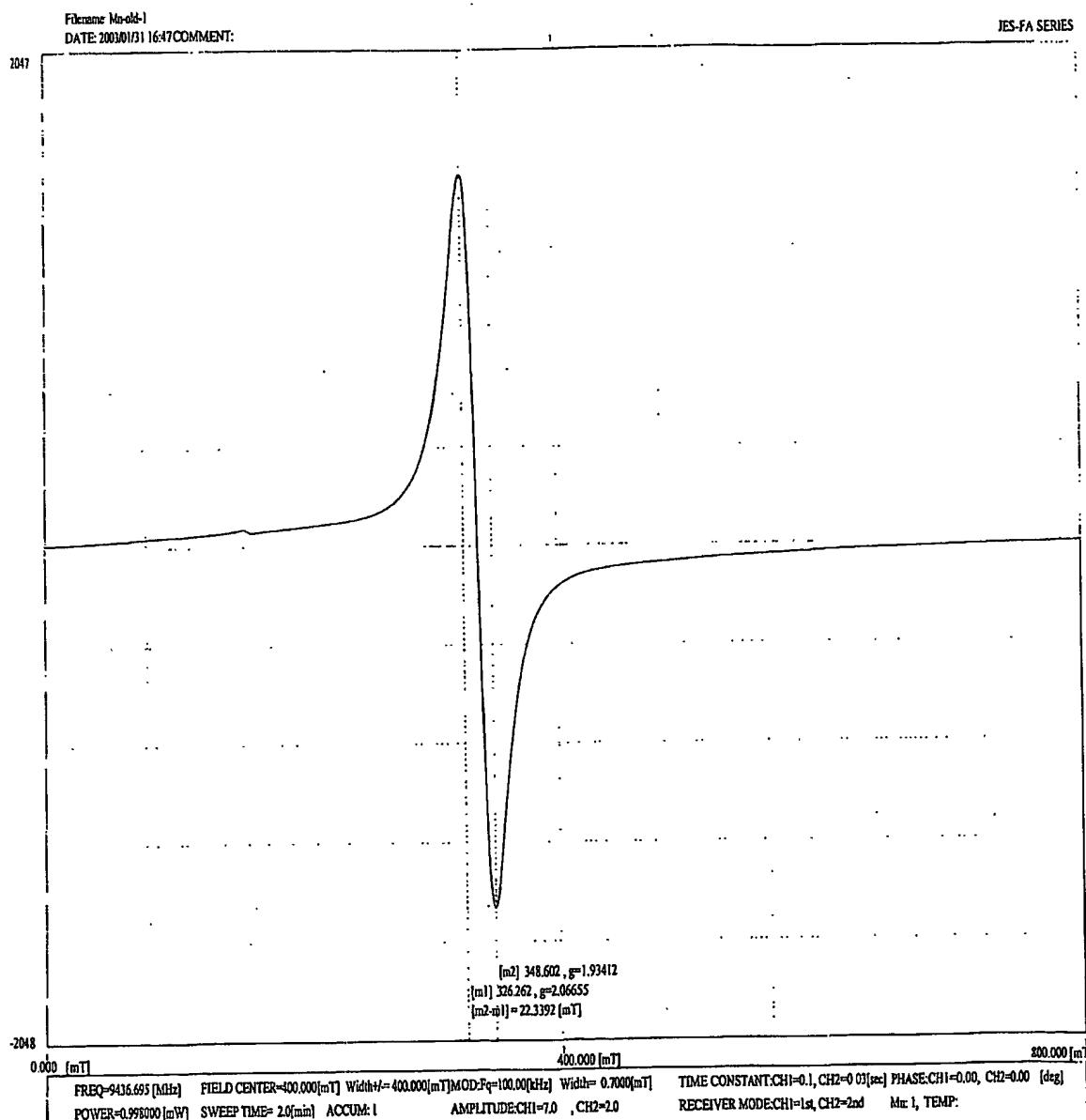


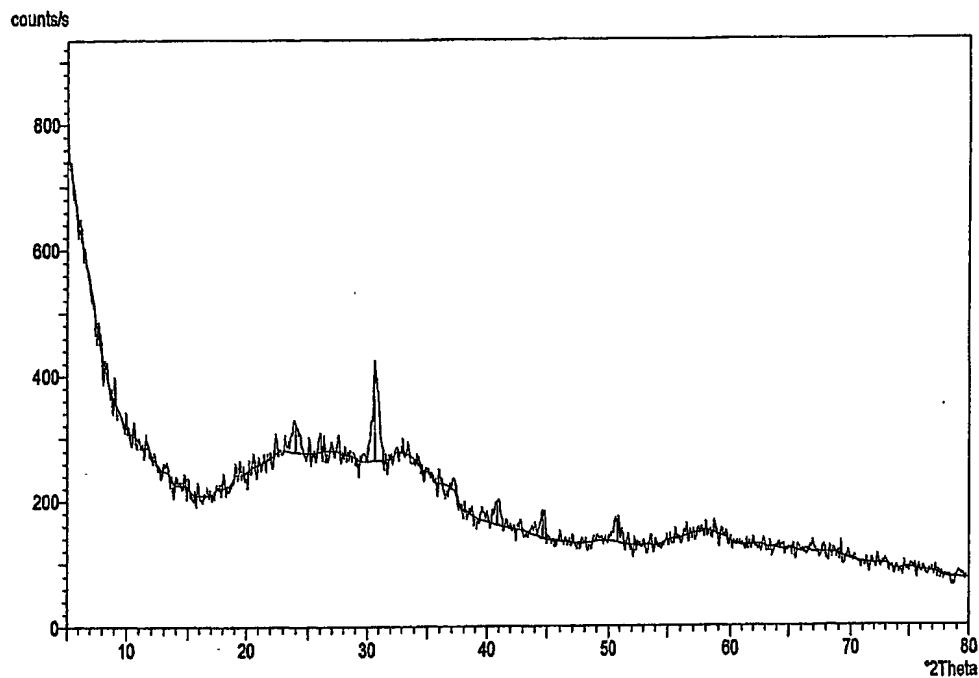
Figure 11-C

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XRD (X-ray diffraction) pattern of manganese silicate (synthesized at neutral (pH 6-7) reaction conditions).

X'Pert Graphics & Identify  
Graph: MC-R

User-1  
2/3/03 11:49



Philips Analytical

Figure 11-C

XRD (X-ray diffraction) pattern of manganese silicate (synthesized at neutral (pH 6-7) reaction conditions).

<u>X'Pert Graphics &amp; Identify (searched) peak list: MO-R 2</u>		<u>User-1</u> <u>2/3/03 11:50</u>				
Original scan: MO-R.	Date: 2/2/03 16:35					
Description of scan:						
Used wavelength:	K-Alpha1					
K-Alpha1 wavelength (Å):	1.54056					
K-Alpha2 wavelength (Å):	1.54439					
K-Alpha2/K-Alpha1 intensity ratio :	0.50000					
K-Alpha wavelength (Å):	1.54056					
K-Beta wavelength (Å):	1.39222					
Peak search parameter set:	As Measured Intensities					
Set created:	1/8/03 13:03					
Peak positions defined by:	Minimum of 2nd derivative					
Minimum peak tip width (*2Theta):	0.00					
Minimum peak tip width (*2Theta):	1.00					
Peak base width (*2Theta):	2.00					
Minimum significance:	0.60					
d-spacing (Å)	Relative Intensity (%)	Angle (*2Theta)	Peak Height (counts/s)	Background (counts/s)	Tip Width (*2Theta)	Significance
3.70419	29.83	24.00430	44.16	278.06	0.64000	0.71
2.91440	100.00	30.65087	148.04	264.37	0.20000	0.63
2.20663	25.19	40.86153	37.29	162.18	0.48000	0.69
2.02880	29.18	44.62686	43.19	140.28	0.48000	0.68
1.79758	23.71	50.74610	35.10	133.23	0.48000	0.61

Figure 12-A:

Composition analysis of manganese silicate (synthesized at extreme acidic (below pH 2) reaction conditions) using EDAX attached to SEM (Scanning Electron Microscope).

## Weight % by Element

Filenames	O K	NaK	Sik	ClK	MnK
manganese-ne	34.04	0.82	30.75	0.75	33.64

## Atomic % by Element

Filenames	O k	NaK	Sik	ClK	MnK
manganese-ne	54.67	0.92	28.13	0.54	15.73

Figure 12-B

ESR (Electron spin resonance) spectrometer analysis of manganese silicate (synthesized at extreme acidic (below pH 2) reaction conditions).

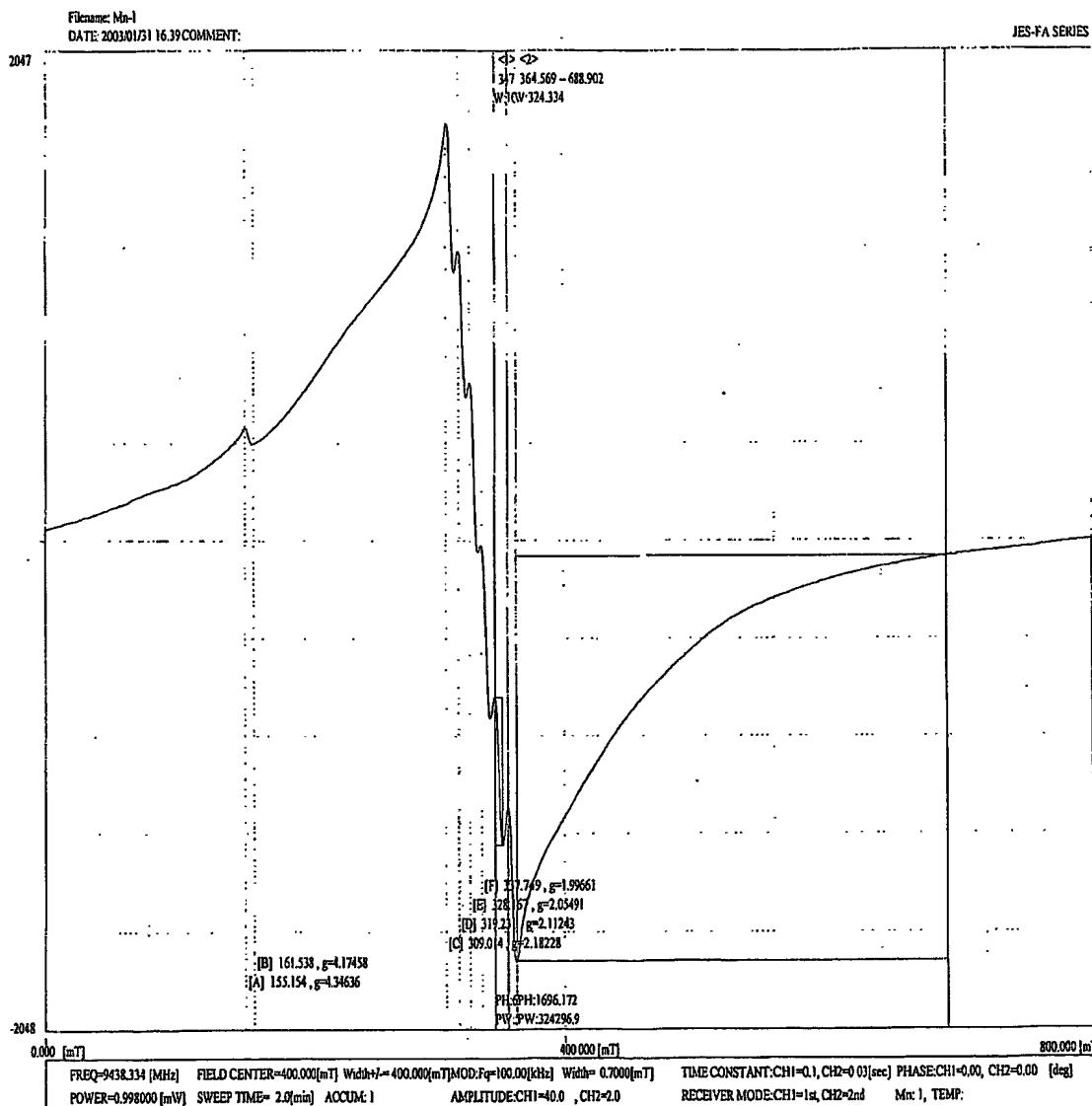


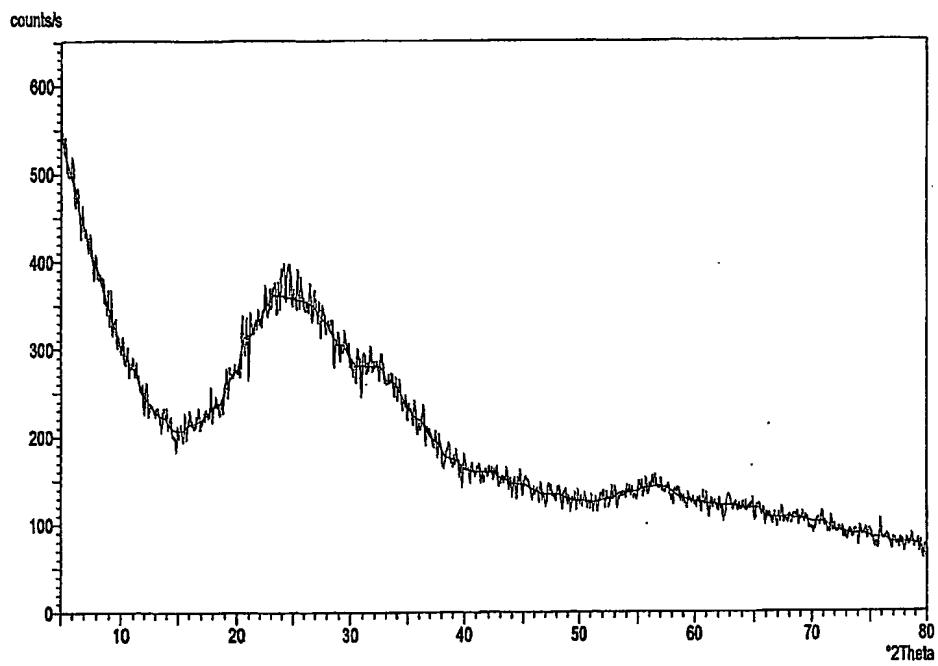
Figure 12-C

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XRD (X-ray diffraction) pattern of manganese silicate (synthesized at extreme acidic (below pH 2) reaction conditions).

X'Pert Graphics & Identify  
Graph: MN-R

User-1  
2/3/03 11:50



Philips Analytical

Figure 12-C

XRD (X-ray diffraction) pattern of manganese silicate (synthesized at extreme acidic (below pH 2) reaction conditions).

X'Pert Graphics & Identify (searched) peak list: MN-R 2		User-1				
		2/3/03 11:51				
Original scan: MN-R	Date: 2/2/03 17:01					
Description of scan:						
Used wavelength:	K-Alpha1					
K-Alpha1 wavelength (Å):	1.54056					
K-Alpha2 wavelength (Å):	1.54439					
K-Alpha2/K-Alpha1 intensity ratio :	0.50000					
K-Alpha wavelength (Å):	1.54056					
K-Beta wavelength (Å):	1.39222					
Peak search parameter set:	As Measured Intensities					
Set created:	1/8/03 13:03					
Peak positions defined by:	Minimum of 2nd derivative					
Minimum peak tip width (^2Theta):	0.00					
Minimum peak tip width (^2Theta):	1.00					
Peak base width (^2Theta):	2.00					
Minimum significance:	0.60					
d-spacing (Å)	Relative Intensity (%)	Angle (^2Theta)	Peak Height (counts/s)	Background (counts/s)	Tip Width (^2Theta)	Significance
3.60774	100.00	24.65599	32.88	359.03	0.96000	0.7

## Figure 13-A:

Composition analysis of zirconium silicate (synthesized at neutral (pH 6-7) reaction conditions) using EDAX attached to SEM (Scanning Electron Microscope).

## Weight % by Element

Filenames	o k	Sik	ZrL
zircon99.spc	39.00	14.78	46.22

## Atomic % by Element

Filenames	o k	Sik	ZrL
Zircon99.spc	70.23	15.17	14.60

Figure 13-B

ESR (Electron spin resonance) spectrometer analysis of zirconium silicate (synthesized at neutral (pH 6-7) reaction conditions).

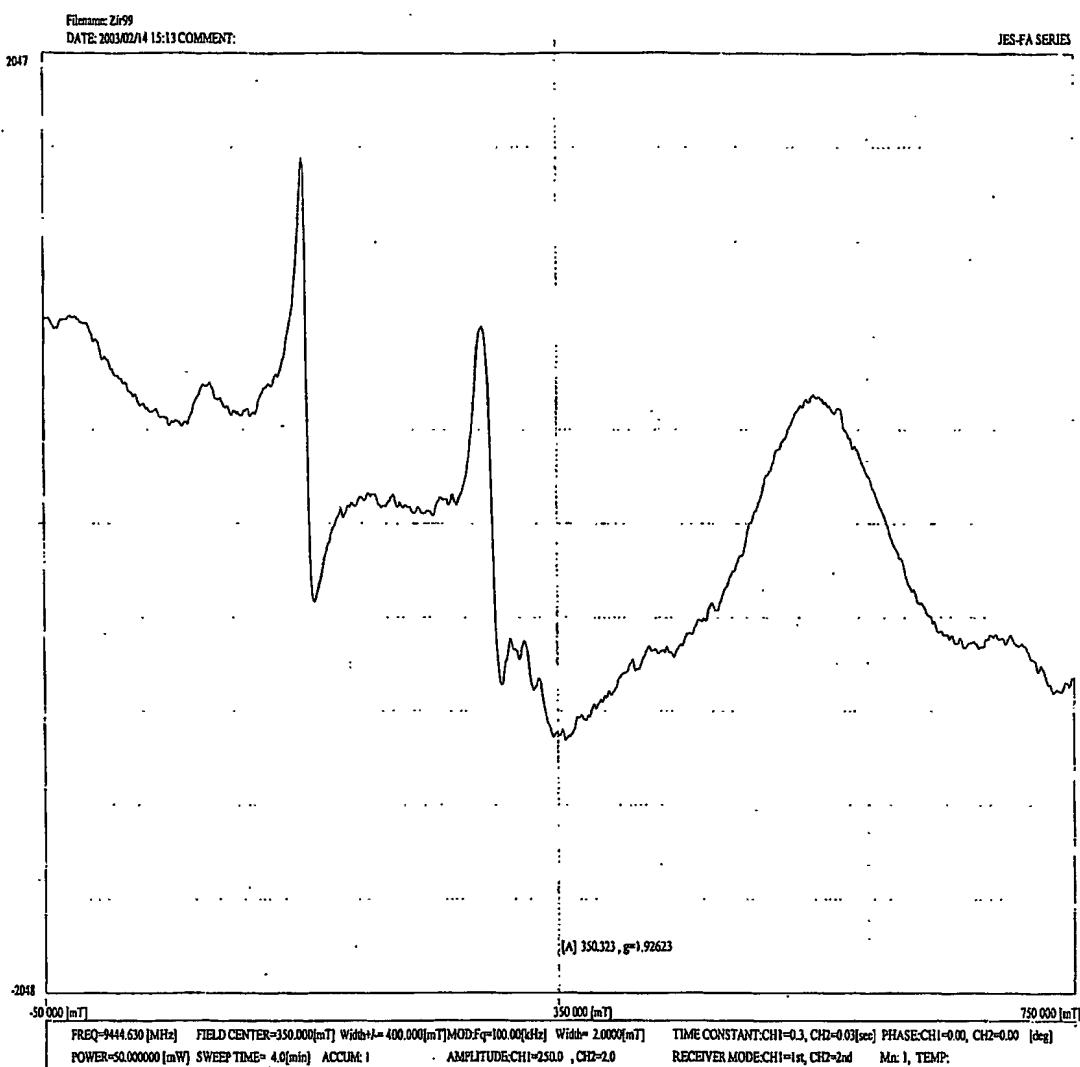
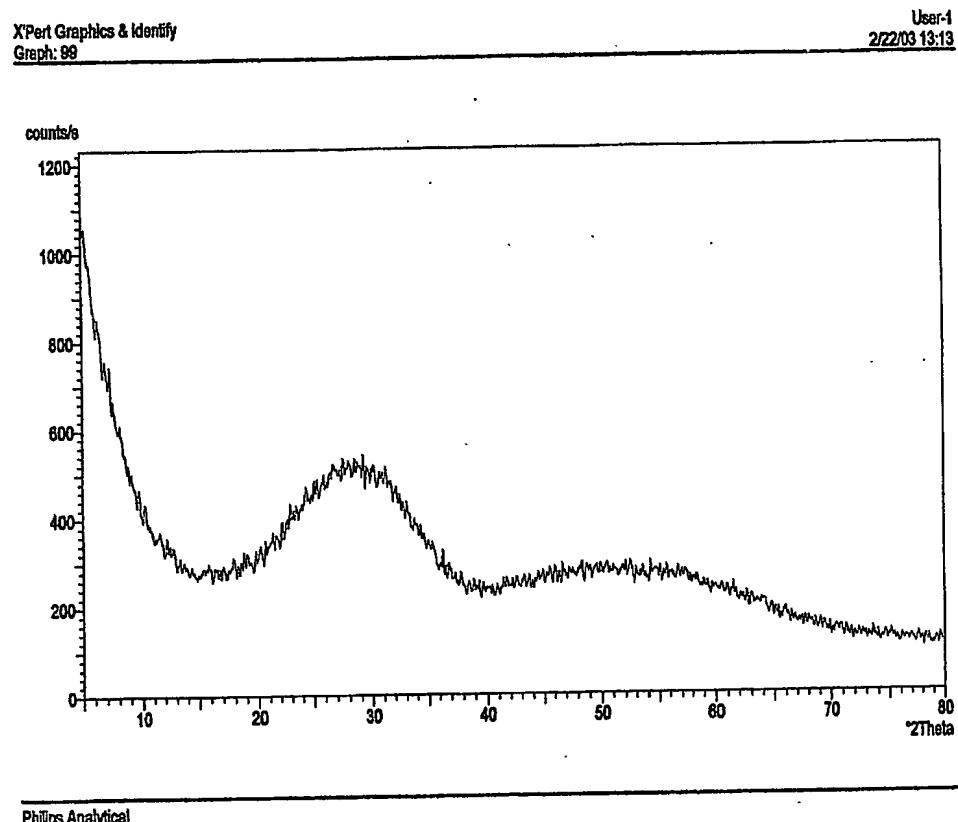


Figure 13-C

XRD (X-ray diffraction) pattern of zirconium silicate (synthesized at neutral (pH 6-7) reaction conditions).



**Figure 14-A:**

Composition analysis of zirconium silicate (synthesized at extreme acidic (below pH 2) reaction conditions using EDAX attached to SEM (Scanning Electron Microscope).

**Weight % by Element**

Filenames	o k	NaK	Sik	ZrL	C1K
Zircon55.spc	51.43	0.95	26.86	20.76	0.00

**Atomic % by Element**

Filenames	o k	NaK	Sik	ZrL	C1K
Zircon55.spc	72.40	0.93	21.54	5.13	0.00

Figure 14-B

ESR (Electron spin resonance) spectrometer analysis of zirconium silicate (synthesized at extreme acidic (below pH 2) reaction conditions).

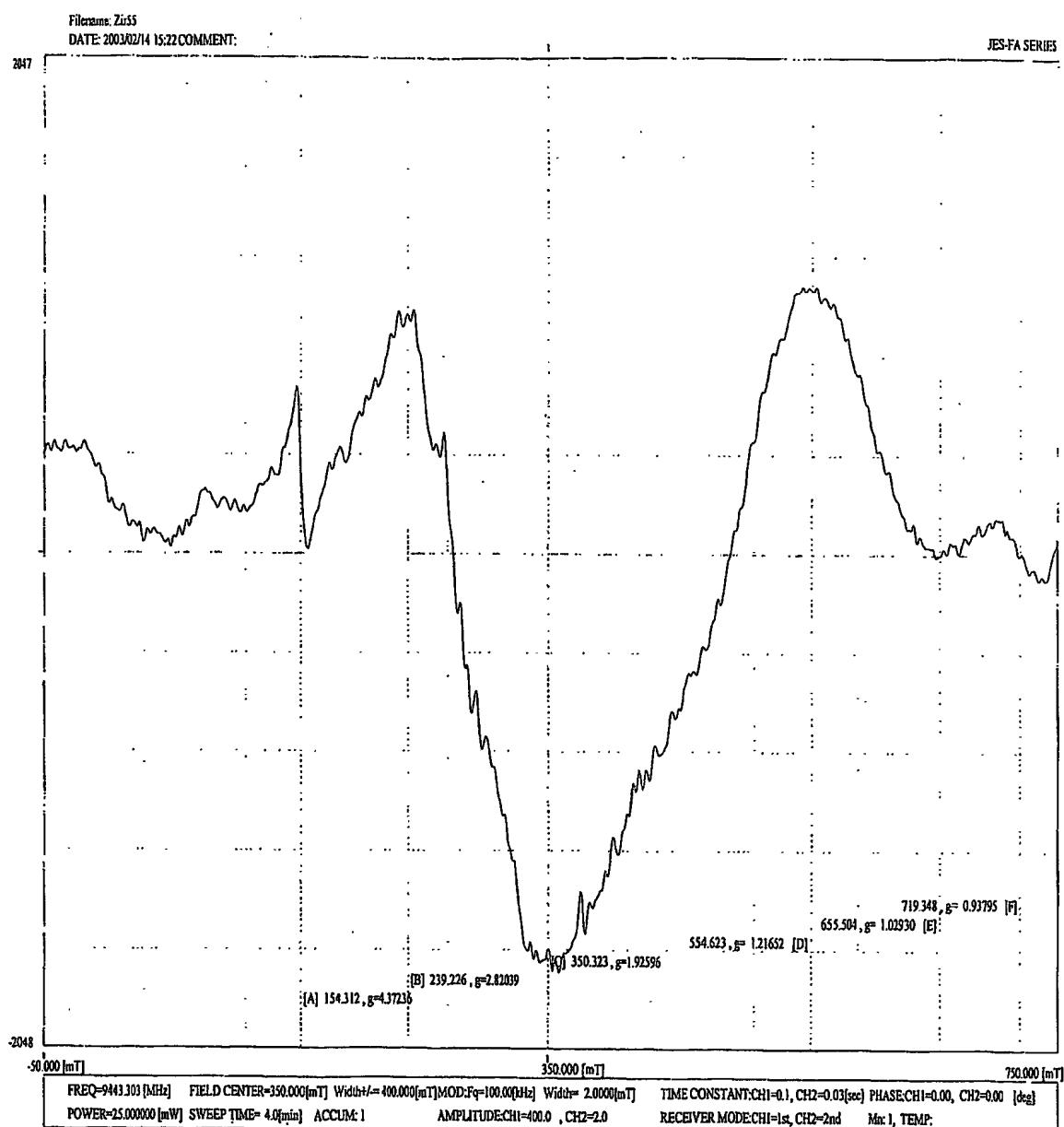


Figure 14-C

XRD (X-ray diffraction) pattern of zirconium silicate (synthesized at extreme acidic (below pH 2) reaction conditions).

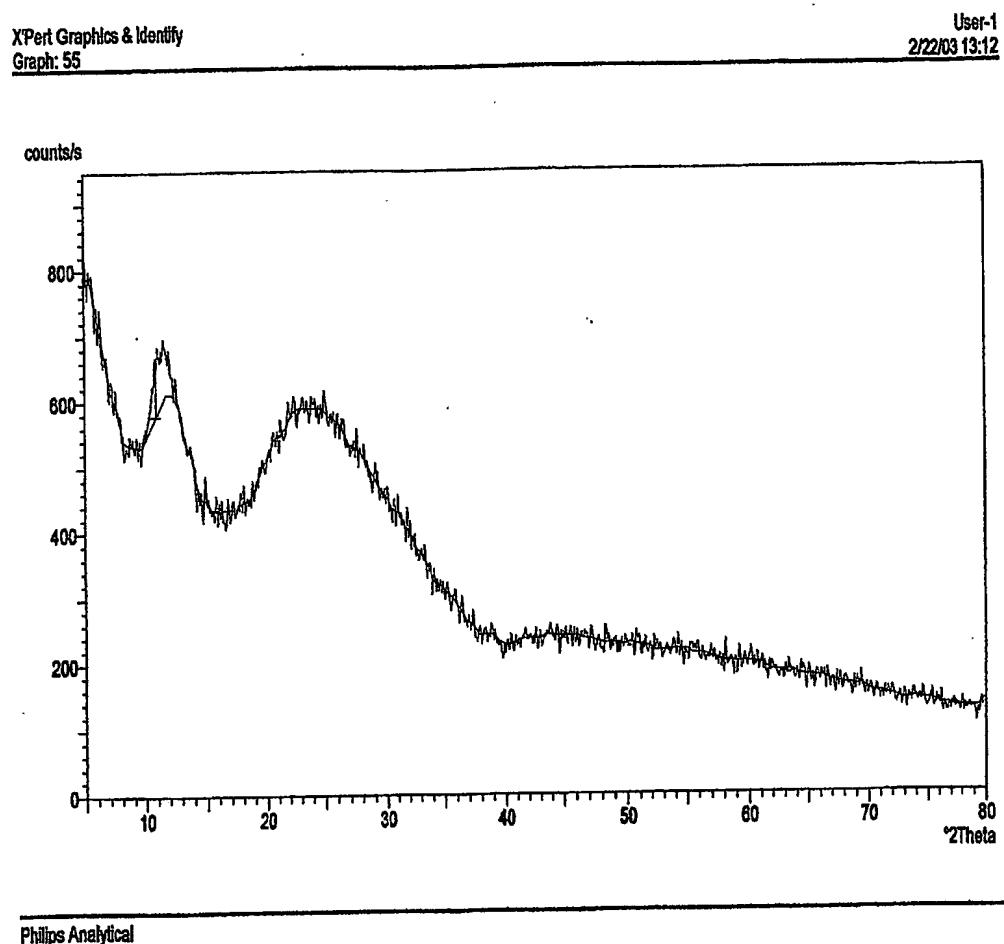


Figure 14-C

XRD (X-ray diffraction) pattern of zirconium silicate (synthesized at extreme acidic (below pH 2) reaction conditions).

X'Pert Graphics & Identify (searched) peak list: 55 2		User-1 2/22/03 13:12				
Original scan: 55	Date: 2/22/03 11:31					
Description of scan:						
Used wavelength:	K-Alpha1					
K-Alpha1 wavelength (Å):	1.54056					
K-Alpha2 wavelength (Å):	1.54439					
K-Alpha2/K-Alpha1 intensity ratio :	0.50000					
K-Alpha wavelength (Å):	1.54056					
K-Beta wavelength (Å):	1.39222					
Peak search parameter set:	As Measured Intensities					
Set created:	1/8/03 13:03					
Peak positions defined by:	Minimum of 2nd derivative					
Minimum peak tip width (°2Theta):	0.00					
Minimum peak tip width (°2Theta):	1.00					
Peak base width (°2Theta):	2.00					
Minimum significance:	0.60					
d-spacing	Relative Intensity (%)	Angle (°2Theta)	Peak Height (counts/s)	Background (counts/s)	Tip Width (°2Theta)	Significance
8.11438	100.00	10.89433	84.80	578.00	0.80000	0.69